World Grasslands and Biodiversity Patterns:
Appendix B. Classification Descriptions and Details of Species Richness Information

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What you should know

Grassland Types

A Report to IUCN
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NatureServe
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IMPORTANT: To use the buttons in this spreadsheet, you must enable macros when you open the file.
For more information search Excel help for "Macro Security."

A Brief Introduction to the IVC Hierarchy

The IVC Revised Hierarchy is available for review, with the intent that it be peer-reviewed by interested colleagues. The overall hierarchy has been developed through an international collaboration. Details of the revised hierarchy are available in FGDC (2008), Jennings et al. (2009), and Faber-Langendoen et al. (2008, 2009).

Work on the IVC is currently directed by NatureServe and coordinated with partners. In the United States, a major partner is the Federal Geographic Data Committee, Vegetation Subcommittee, which is chaired by the U.S. Forest Service, and includes participation for federal agency partners, the Ecological Society of America, and NatureServe. For more information on this project, see Faber-Langendoen et al. (2010, draft).

Here's what you should know about the revised IVC Hierarchy

1. The IVC Hierarchy is dynamic in content: The classification is dynamic, subject to change as vegetation scientists revise or newly describe vegetation types (Peet 2008). For this reason, your input is always welcome.

2. A draft full hierarchy for the U.S and other parts of the world: A draft hierarchy is available for various parts of the world, especially in parts of North America, South America, and Africa. The hierarchy has eight levels (Table 1), with criteria for each level (Table 2). The hierarchy is currently stored and managed in an IVC database (Biotics), then exported here as a spreadsheet.

Table 1. Summary of Criteria and Rationale for the Natural Vegetation Hierarchy.

Hierarchy Level	Criteria
Upper: Physiognomy plays a predominant role.	
L1 – Formation Class	Broad combinations of general dominant growth forms that are adapted to basic temperature (energy budget), moisture, and/or substrate or aquatic conditions
L2 – Formation Subclass	Combinations of general dominant and diagnostic growth forms that reflect global macroclimatic factors driven primarily by latitude and continental position, or that reflect overriding substrate or aquatic conditions
L3 – Formation	Combinations of dominant and diagnostic growth forms that reflect global macroclimatic factors as modified by altitude, seasonality of precipitation, substrates, and hydrologic conditions
Middle: Both floristics and physiognomy play a significant role.	
L4 – Division	Combinations of dominant and diagnostic growth forms and a broad set of diagnostic plant taxa that reflect biogeographic differences in composition and continental differences in mesoclimate, geology, substrates, hydrology, and disturbance regimes
L5 – Macrogroup	Combinations of moderate sets of diagnostic plant species and diagnostic growth forms that reflect biogeographic differences in composition and sub-continental to regional differences in mesoclimate, geology, substrates, hydrology, and disturbance regimes
L6 – Group	Combinations of relatively narrow sets of diagnostic plant species (including dominants and co-dominants), broadly similar composition, and diagnostic growth forms that reflect biogeographic differences in composition and sub-continental to regional differences in mesoclimate, geology, substrates, hydrology, and disturbance regimes
Lower: Floristics plays a predominant role**.**	
L7 – Alliance	Diagnostic species, including some from the dominant growth form or layer, and moderately similar composition that reflect regional to subregional climate substrates, hydrology, moisture/nutrient factors, and disturbance regimes

L8 – Association	Diagnostic species, usually from multiple growth forms or layers, and more narrowly similar composition that reflect topo-edaphic climate, substrates, hydrology, and disturbance regimes

Table 2. Pilot Example of the Revised 2008 USNVC Hierarchy Set of Types.

Revised Hierarchy for Natural Vegetation	Example
Upper Levels	
1 – Formation Class	**Scientific Name:** Mesomorphic Tree Vegetation Colloquial Name: Forest and Woodland
2 – Formation Subclass	**Scientific Name:** Temperate Forest Vegetation Colloquial Name: Temperate Forest
3 – Formation	**Scientific Name:** Cool Temperate Tree Vegetation Colloquial Name: Cool Temperate Forest
Mid Levels	
4 – Division	**Scientific Name:** *Pseudotsuga – Tsuga – Picea - Pinus* Forest Division Colloquial Name: Western North America Cool Temperate Forest
5 – Macrogroup	**Scientific Name:** *Pseudotsuga menziesii - Quercus garryana – Pinus ponderosa - Arbutus menziesii* Macrogroup Colloquial Name: Northern Vancouverian Montane and Foothill Forest
6 – Group	**Scientific Name:** Pinus ponderosa - Quercus garryana- Pseudotsuga menziesii Group Colloquial Name: East Cascades Oak-Ponderosa Pine Forest and Woodland
Lower Levels	
7 – Alliance	**Scientific Name:** *Pinus ponderosa - Quercus garryana* Woodland Alliance Colloquial Name: Ponderosa Pine - Oregon White Oak Woodland Alliance
8 – Association	**Scientific Name:** *Pinus ponderosa - Quercus garryana / Balsamorhiza sagittata* Woodland Colloquial Name: Ponderosa Pine - Oregon White Oak / Arrowleaf Balsamroot Woodland

3. Naming of the types: The spreadsheet only provides the colloquial names, as these are most descriptive of the overall concept (including vegetation and the associated biogeographic and ecological relationships). These names are also likely to be of most use to a wide variety of users. The scientific names are provided in the Group and Macrogroup Description documents (see #5 below).

4. The IVC and Systems: The spreadsheet occasionally shows how NatureServe Ecological Systems are linked to the IVC, at the Group level. The link shown is a "best fit." Systems sometimes represent complexes of associations from multiple IVC classes, so the relationship is not always 1:1. A number of partners are using Systems as part of vegetation mapping projects, and need to see how Systems relate to the IVC.

5. Descriptions of IVC Units: Macrogroup and Group descriptions are becoming available for review, particularly in the United States. If a Group description is available for peer review, it is shown as a "PR1" (peer review, phase 1). Association and alliance descriptions are already available in provisional form on NatureServe Explorer (*www.natureserve.org/explorer*).

6. Collaboration with partners: Many partners, including members of the NatureServe network, maintain lists of IVC associations, or crosswalks to them, providing much additional information not shown here.

References

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Faber-Langendoen, D., D.L Tart, and R.H.Crawford. 2009. Contours of the revised U.S. National Vegetation Classification standard. Bulletin of the Ecological Society of America 90:87–93.

FGDC. 2008. National Vegetation Classification Standard, Version 2 FGDC-STD-005-2008 (version 2). Vegetation Subcommittee, Federal Geographic Data Committee, FGDC Secretariat, U.S. Geological Survey, Reston, VA. 55pp + Appendices.

Jennings, M.D., D. Faber-Langendoen, O.L. Loucks, R.K. Peet, and D. Roberts. 2009. Characterizing Associations and Alliances of the U.S. National Vegetation Classification. Ecological Monographs 79: 173–199.

Peet, R.K. 2008. A Decade of Effort by the ESA Vegetation Panel Leads to a New Federal Standard. Bulletin of the Ecological Society of America: Vol. 89, No. 3 pp. 210–211.

Formations & Richness Sum

FORMATION	SPECIES RICHNESS (based on Averages of Averages)		
	10–30 m^2	30–100 m^2	101–1,000 m^2
2.A.1 Tropical Lowland Shrubland, Grassland & Savanna		40 (22–65)	64 (53–75)
2.A.2 Tropical Montane Shrubland, Grassland & Savanna	18 (13–27)	38 (21–51)	36 (21–51)
2.B.2 Mediterranean Grassland & Forb Meadow			50 (42–61)
2.C.1 Temperate Grassland, Meadow & Shrubland		35 (28–45)	41 (33–49)
2.C.1 Temperate Grassland, Meadow & Shrubland (very rich)	50 (43–57)	49 (45–59)	67 (54–79)
2.C.2 Boreal Grassland, Meadow & Shrubland			
3.B.1 Cool Semi-Desert Scrub & Grassland			23 (20–28)
4.B.1 Alpine Scrub, Forb Meadow & Grassland		36 (19–53)	68 (67–69)

Formation	D_Key	Division	Description	Geographic Range
2.A.1 Tropical Lowland Shrubland, Grassland & Savanna				
		2.A.1.Ea Central American- Caribbean Lowland Shrubland, Grassland & Savanna	Among the grasslands and savannas included in this Division, the most important by far is the extensive savanna region on the left (north and west) side of the Orinoco River in Colombia and Venezuela, also known as Llanos. Four distinct savanna vegetation subregions exist in the Llanos, reflecting drainage differences, all of them dominated by perennial grasses; the Overflow Plains, the Aeolian Plains, the High Plains, and the Piedmont Savannas.	This type is found on the north and west side of the Orinoco River in Colombia and Venezuela.
		2.A.1.Eb Amazonian Shrubland and Savanna	Savannas are a restricted vegetation formation in the Amazon basin, they occur in comparatively small extensions localized in different parts of the basin. The occurrence of natural savannas in the Amazon basin is correlated with characteristic edaphic conditions, more commonly sandy soils. These savannas are similar to other savannas of the continent in the range of physiognomic types, from open with few scattered woody elements to parklands (trees/shrubs are aggregated), to woodlands. Like with other savannas the variation is correlated with drainage conditions and soil nutrients.	Northwestern Brazil, adjacent southeastern Colombia and southwestern Venezuela, southeastern Peru and northern Bolivia.
		2.A.1.Ec Guayana Shrubland and Savanna	Savannas of Roraima-Rupununi on soils derived from the ancient surfaces of the Guayana Shield. They occur from 400-800 m elevation and show the typical varaition in vegetation physiognomy of other tropical savannas, from open to treed savannas. In the Roraima savannas, the herbaceous layer is the most diverse in plant species	Northern Brazil, extending to southern Venezuela and the Guianas, with 230,104 km2
		2.A.1.Ed Parana Brazilian Shrubland and Savanna	The largest area of tropical savanna in South America occurs on the oldest surfaces of the Brazilian Shield. Since almost all of its lies in Brazil, the overall name given to these savannas is C*errado* , a Portuguese word that means "closed" and refers to the dense woodland vegetation that occur across extensive areas. Here again, all of the general types of savanna are found, the difference is their richness, an estimated 10,000 species occur in the cerrados, the highest plant diversity of all the world's savannas, with an estimated 40% endemics (Woodward 2008)	Central Brazil and outliers in adjacent Bolivia. The Beni savannas of Bolivia are floristically related to the Cerrados
		2.A.1.Ee Chacoan Shrubland and Savanna	The largest area of tropical savanna in South America occurs on the oldest surfaces of the Brazilian Shield. Since almost all of its lies in Brazil, the overall name given to these savannas is C*errado* , a Portuguese word that means "closed" and refers to the dense woodland vegetation that occur across extensive areas. Here again, all of the general types of savanna are found, the difference is their richness, an estimated 10,000 species occur in the cerrados, the highest plant diversity of all the world's savannas, with an estimated 40% endemics (Woodward 2008)	Southern Bolivia, western Paraguay and northern Argentina.
		2.A.1.Ff West-Central African Mesic Woodland and Savanna	This is a moist savanna woodland, where annual rainfall averages 1,000–1,500 mm. Tall grasses dominate, but the landscape contains many patches of *Isoberlinia* and other types of woodland. Gallery forests along streams are conspicuous and important habitat for the animals of the region.	Western Africa and areas surrounding the Congo basin, transitioning towards the Sahel in the north and towards the central African savannas in the south.

Formation	D_Key	Division	Description	Geographic Range
		2.A.1.Fg Eastern and Southern African dry savanna and woodland	This division includes in its broad concept the dry savannas (bushlands) of Acacia–Commiphora and the grass savannas of the Serengeti Plains and Ngorongoro Crater, all in eastern Africa. The eastern dry savannas lie in a mixing zone for the desert-adapted species of the northern East African savannas and the more tropical species that dominate in the moister, southern parts of the region. This is the "typical" Acacia savanna. It is included as well another large area of savanna separated from the East African savannas but with many of the same species or close relatives extending from east-central	The East African savannas straddle the equator from Somalia (16° N) south through eastern Ethiopia and Kenya into Tanzania (9° S). And the Southern African savannas occupy an area in the Southern Hemisphere from Namibia to Mozambique and south into the Eastern Cape Province of South Africa (from 18° S in the western part to as far as 34° S in South Africa) (Woodward 2008).
		2.A.1.Fh Mopane Savanna	North of the Oliphants River is a dense tree and shrub savanna composed almost exclusively of *Colosphospermum mopane* (mopane). A few other woody plants are found in the area; most noticeable and most spectacular are large, often solitary specimens of Adansonia digitata (baobab). Despite the tree cover precipitation is low - between 400 and 700 mm annually, falling in late summer. It occupies the western edge of the Central African Plateau; this region above ca. 1000 m elevation, is mostly flat.	Namibia, Angola, Botswana and South Africa.
		2.A.1.Fi Sudano Sahelian Dry Savanna	West African savannas lie directly south of the Sahara and form a clear transition from the arid conditions of the Sahara to the year-round precipitation conditions of the Congo rainforest. The wide transition belt is known as the Sahel, in its northern part the dry season lasts 6–8 months. The vegetation of the Sahel is that of a dry grassland with a sparse upper layer of scattered bushes and small trees, generally less than 15 ft (5 m) tall. Most of the grasses are annuals, which are better able than perennial species to withstand long dry periods. The bushes are primarily different kinds of thorny Acacia. The Sahel is vulnerable to yearlong drought during El Niño years and	Forms a well defined belt from the Atlantic coast of Senegal and southernmost Mauritania east to the Red Sea coast of Sudan.
		2.A.1.Ij Indomalayan Mesic Savanna and Grasslands	Most tropical and subtropical savannas in this region are secondary, having invaded areas abandoned from cultivation following clearing of the original rain forest and wet sclerophyll forest. For example, *c.* 2 _ 106 km2 of south-east Asia is grassland dominated by *Imperata cylindrica* between altitudes of 300 and 700 m. In more limited areas above 900 m Arundo madagascariensis dominates. These secondary savannas develop on deep basaltic soil and spread with the burning associated with shifting cultivation (Gibson, ..)	Southern and south-east Asia, including part of India, Burma and the Malay Peninsula.
		2.A.1.Lk Australian Tropical Savanna	The tropical savannas of Australia occur in the north, in a region influenced by monsoonal climate patterns. Rainfall ranges from 1,500 mm a year in the north to about 500 mm in the southern part of the savanna region. The major trees are Eucalyptus spp. (gum trees). The northern humid type is the tallgrass savanna, common grasses are red oat grass and annual Sorghum spp, Heteropogon spp. (black spear grasses) and Themeda spp. (kangaroo grasses).	Savannas occur across northern Australia, curving southward along the east coast of Queensland into the subtropics. They are located between 17° S and 29° S, in a region influenced by monsoonal climate patterns (Woodward 2008).
		2.A.1.Ol Polynesian Lowland Shrubland, Grassland & Savanna	Information not available.	

Formation	D_Key	Division	Description	Geographic Range
		2.A.1.Om Eastern Melanesian Lowland Shrubland, Grassland & Savanna	Information not available.	
2.A.2 Tropical Montane Shrubland, Grassland & Savanna				
		2.A.2.Ea Tropical Andes Shrubland and Grassland	Species rich, moist grasslands and shrublands, above 3300 m elevation in the northern and central Andes. Tussok grassland up to 0.6 m, frequently with interspersed short to mid tall shrubs, rosette forbs and cushion forming plants.	Corresponds to the "alpine vegetation" belt of the Andes; from the Venezuelan Andes southward into the central Bolivian high plateau (Altiplano)
		2.A.2.Eb Caribbean and Central American Montane Shrubland and Grassland	Information not available.	
		2.A.2.Ec Guayanan Montane Shrubland and Grassland	The most extensive and representative of this type are the mostly open (treeless) savannas of the Gran Sabana region, a 800-1400 m elevation plateau in the southeastern part of Venezuela. These are savannas dominated by Trachypogon and Axonopus grasses. Interspersed in the grass savanna there are forb meadows dominated by herbs and rosettes of the Rapataceae, Xyridaceae and Bromeliaceae. These meadows tend to occupy the more swampy substrates	
		2.A.2.Ed Parana Brazilian Montane Shrubland and Savanna	This division is mostly represented by the "Campos rupestres" montane savannas of the Espinhaço Range, extending along the coast of Brazil, from North Bahia southward to Minas Gerais. The dominant vegetation is a type of savanna known as campos rupestres or rock fields and lies between 700 and 2,000 m in elevation. Plants grow in a wide variety of inhospitable substrates including stone, rock (epilithic), recently decomposed stony soils, or sandy soils. The climate is mesothermic with mild summers accompanied by a rainy season. There is also a 3 to 4 month dry season during the winter.Campos rupestres are a mosaic of communities, higly diverse and rich in endemic plants, under the control of local topography, microclimate and the nature of	
		2.A.2.Fe African montane grassland and shrubland	This ecosystem occurs in the areas where human activity has been largest and most intense, and is found at altitudes between 1500 and 3000 m, most extensively in the vulcanoes of East Africa. The montane grassland in most places is derived from forest and other woody vegetation types.	Ethiopia, Kenya, Tanzania
		2.A.2.Ff African (Madagascan) montane grassland and shrubland	The high altitude grasslands of Madagascar are well represented in the Andringitra Massif located in south-central Madagascar with an elevation range of 600-2600 m. The ancient granite and gneiss mountain has complex geomorphological features, including an extensive plateau surrounded by rocky sand towers and rockfalls. The dry and rainy seasons are linked respectively with the austral winter and summer.The vegetation corresponds to a subalpine prairie with ericoid bushes, wet and dry grasslands and rich geophyte communities on the many rock outcrops. Overall it is a highly biodiverse and	
		2.A.2.If Indomalayan Montane Meadow	Information not available.	
		2.A.2.Lg New Guinea Montane Meadow	Information not available.	
	D076	**2.A.2.Oh Polynesian Montane Shrubland, Grassland & Savanna**	Information not available.	

Formation	D_Key	Division	Description	Geographic Range
		2.A.2.Oi Eastern Melanesian Montane Shrubland, Grassland & Savanna	Information not available.	
2.B.2 Mediterranean Grassland & Forb Meadow				
	D021	**2.B.2.Na California Grassland & Meadow**	The California Grassland & Meadow type is found in central and coastal California. The valley grassland is dominated by annual plants, and these same annual plants can occur under *Quercus douglasi* i savanna. The climate is typical Mediterranean with cool, wet winters and hot dry summers, with rainfall varying from 12 to 200 cm, with soil moisture deficits common for 4 to 8 months. Much of the "valley grassland" vegetation is now dominated by non-native, naturalized annual grass and forb species, in contrast to the original grassland dominants, that were thought to be perennial bunchgrasses, especially *Stipa pulchra.S27 Common n* on-natives include *Bromus hordeaceus, Bromus diandrus, Bromus madritensis ssp rubens, Avena barbata, Avena fatua, Lolium multiflorum, Erodum botrys* and *Erodium cicutarium.* By contrast the coastal prairie is a native "*Festuca idahoensis - Danthonia californica* " perennial grass type, though many annual and perennial exotics	This type is restricted to California, where it is found as valley prairie in low-elevations west of the Sierra-Cascade crest, southern California and Baja California, west of the Northern Peninsula Ranges, and then as coastal prairie from Santa Barbara County to to the Oregon border and inland to the Sierra Foothills.
	Dnew	**2.B.2.Px Mediterranean Basin Dry Grassland**	This grassland type is found throughout the Mediterranean region of Europe and north Africa. It is found on both calcareous and acidic soils, and on deep to shallow soils, including coastal beaches. Perennial and annual grasses are present, and a rich diversity of forbs.	
	Dnew	**2.B.2.Pc Mediterranean Basin Montane Grassland & Scrub**	This grassland and scrub type is found throughout the montane Mediterranean region of Europe and north Africa. It is found on both alkaline and acidic soils. Dominant growth forms include grasses, hemicryptophytes, chameaphyes, low scrub, phrygana, and cushion scrub.	
	D new	**2.B.1.Ea Chilean Mediterranean Scrub**	Information not available.	
	D new	**2.B.1.Fb South African Cape Mediterranean Scrub**	The Fynbos biome comprises three quite different, naturally fragmented vegetation types (fynbos, renosterveld and strandveld) that occur in the winter and summer rainfall areas, are dominated by small leaved, evergreen shrubs and whose regeneration is intimately related to fire. It is endemic to South Africa with an extremely species rich and endemic flora	South Africa Cape Region
	D new	**2.B.1.La Australian Mediterranean Scrub**	Information not available.	
2.C.1 Temperate Grassland, Meadow & Shrubland				
		2.C.1.Ea Pampas Grassland & Shrubland	The South American Campos or Pampas is a very extensive subtropical/temperate grassland region lying between 24°S and 35°S, covering an area of approximately 500 000 km2. The term Campos refers to grasslands or pastures with a vegetation cover comprising mainly grasses and herbs; scattered small shrubs and trees are occasionally found, generally by the banks of streams	Includes parts of southern Brazil, southern Paraguay and northeastern Argentina , and the whole of Uruguay.
		2.C.1.Eb Southern Andean Shrubland and Grassland	The high Andean grasslands and shrublands occur in the southern temperate latitudes at much lower elevations than their tropical counterparts. Above 2000 m elevation the non-forest vegetation is the dominant with annual and perennial forbs, perennial graminoids, grasses, sedges and rushes, and suffruticose plants, shrubs	High Andes of Chile and Argentina

Formation	D_Key	Division	Description	Geographic Range
		2.C.1.Fc Southern African Montane Grassland	The Grassland biome in South Africa occurs mainly on the high central plateau (Highveld), the inland areas of the eastern seaboard, the montane areas of KwaZulu Natal and the central parts of the Eastern Cape. The main vegetation is dominated by graminoids; woody plants are rare, absent or confined to specific habitats and are usually low to medium size shrubs.	South Africa, Lesotho.
	Dnew	**2.C.1.La Australian Temperate Grassland & Shrubland**	The Australian Grassland & Shrubland type is found in temperate regions of eastern and northern Australia. Commonly referred to as "tussock grassland," this type receives between 20 and 50 cm average annual rainfall and characterised by summer rain. It is dominated by *Astrebla spp* . Somewhat more moist "temperate subhumid grassland" in southeast Australia receive 50 to 100 cm average annual rainfall. It is dominated by *Themeda, Poa* and *Stipa* . There are also extensive areas of derived grasslands, particularly in the understory of *Eucalyptus* woodlands, though they may contain native grasses, such as *Danthonia, Poa,* and *Themeda*.	This type is found in temperate regions of eastern and northern Australia south of the subtropical region. The "tussock grassland" type is extensively distributed through inland Queensland, the Northern Territory, and northern Western Australia. Somewhat more moist "temperate subhumid grasslands" are found from north of Adelaide to northern New South Wales
	Dnew	**2.C.1.Lb New Zealand Grassland & Shrubland**	The New Zealand Grassland & Shrubland is either grassland dominated or a mosaics of grassland and shrubland that covers nearly 60% of New Zealand. Generally these grasslands are dominated in the higher altitudes and in dry inland areas by native species of tussock form, and at the lower altitudes by sward-forming introduced species. Most have been deliberately modified for pastoral use, and almost none have escaped indirect effects of human settlement, such as grazing by feral mammals. Grassland types include Chionochloa grasslands, short tussock grasslands, and various maritime and coastal grasslands, the latter more strongly shaped by human activities.	Grasslands and mosaics of grassland and shrubland cover nearly 60% of New Zealand, being distributed from the subtropical Kermadecs to far-southern Macquarie Ilsand, and from fertile lowlands to the alpine belt.
	D022	**2.C.1.Na Vancouverian & Rocky Mountain Grassland & Shrubland**	The Vancouverian and Rocky Mountain grasslands occur scattered throughout the forest landscape. They occur in various sizes, dominated by grasses, sedges, forbs, and sage. Larger examples are locally called "parks," while smaller, mesic to moist examples are often called meadows. A variety of factors account for their presence, including soil texture (colluvial, alluvial and thin soils), periodic fire, drought, and grazing.	This type is found through the montane regions of the western United States and Canada.
	D023	**2.C.1.Nb Great Plains Grassland & Shrubland**	The Great Plains grasslands occupy a large expanse between the Rocky Mountains on the west, deciduous forests on the east, aspen parkland and boreal forest on the north, and the Gulf of Mexico on the south. The grasslands vary from shortgrass prairie (or steppe) in the southwest part, mixed grass prairie, central and north west, and tallgrass and Texas prairies in the east, with occasionally extensive sand prairies. The vegetation follows a precipatation and temperate gradient from dry and warm in the southwest to cool and wet in the northeast. Oak savannas are most prominent within the tallgrass prairie region (some in the mixedgrass), partly as a transition to oak woodlands and forests of the eastern region. Mesquite and other low shrubs can be common in the southern short and mixedgrass prairie regions.	This type is found in the large central plains of the United States, and into the southern parts of the prairie provinces in Canada (Alberta, Saskatchewan, and Manitoba).

Formation	D_Key	Division	Description	Geographic Range
	D024	**2.C.1.Nc Eastern North American Grassland, Meadow & Shrubland**	The Eastern North American grasslands, meadows, and shrublands occur throughout the eastern cool temperate forest region of the United States and border areas with Canada. Vegetation is largely natural, thoiugh human modification has both expanded some sites (through clearing and fire) and contracted others (through control of natural fires). The type includes include alvars, acid, alkaline and ultramafic glades, rocky outcrops, Interior Plateau patch prairies and Appalachian barrens and grassy balds. They typically share a thin soil habitat, occasional fires, or southerly exposure. The ground layer can vary from more open grassland to scattered short to tall shrubs and trees.	This type occurs through the eastern cool temperate forest region of the United States and border areas with Canada.
	D061	**2.C.1.Nd Western North America Interior Sclerophyllous Chaparral Shrubland**	This distinctive chapparal type occurs in the southwestern United States and northern Mexico, in low montane regions (1000 - 2000 m elevation). It is typically dominated by chapparal, with dense compact crowns and small evergreen sclerophyllous leaves, between 1 and 2. 5 m. Species include *Quercus turbinella, Ceanothus gregii, Ceanothus integerrmus, Arctostaphylos pungen* s and *Arctostaphylos pringlei* with little to no grassland component.	This type occurs in the southwestern United States (New Mexico, Arizona, and California) and into northern Mexico.
	D102	**2.C.1.Ne Southeastern North American Grassland & Shrubland**	The Southeastern North American Grassland & Shrubland occurs irregularly throughout the coastal plain, including sandy,xeric substrates. It can grade into longleaf pine woodlands, where more open "savanna-like" stands can have a strong graminoid layer. In Florida, stands of "sand hill pine scrub" or "Florida scrub" contain *Serenoa repens* , *Sabal etonia* , various scrub oaks (e.g., *Quercus geminata, Quercus myrtifolia*), pine (*Pinus clausa*) and *Ceratiola ericoides*	This types occurs in the southeastern United States, from Texas to Virginia.
	Dnew	**2.C.1.Pa European Grassland & Heath**	The European Grassland & Heath is found throughout temperate regions of Europe east to the Urals. It occurs under a wide range of climatic conditions. The vegetation is dominated by perennial grasses and forbs. Many of the lowland and submontane mesic grasslands in this type are considered "semi-natural," because they result from clearing of forests, often many centuries ago, and are subject to rather intense fertilization, seeding and grazing. Distinct from these are the drier and alpine grasslands, which display many of the characteristics of natural vegetation, including dominance by native species. They appear to be fairly stable in composition if managed by low	The European Grassland & Heath stretches from Ireland and Britain east to the Ural Mountains of Russia, south to the Mediterranean regions of Turkey, and west to Spain.
	Dnew	**2.C.1.Pb Western Eurasian Grassland & Shrubland**	The Western Eurasian Grassland & Shrubland is found in western Eurasia from Ukraine east to Kazakhstan. It is dominated by perennial bunchgrass in Western Eurasia, with north (moist)-south (dry) zonation of the steppes.The western Eurasian steppes became the breadbasket of Ukraine, Russia, and other countries whose territory overlaps the biome. But much of the region has been converted to intensive agricultural production	This types forms a continuous belt west of the Urals, but become fragmented in the large basins east of these mountains, which are an unofficial boundary between Europe and Asia.
	Dnew	**2.C.1.Pc Eastern Eurasian Grassland & Shrubland**	The Eastern Eurasian Grassland & Shrubland extends from Kazakhstan to China, including Mongolia and central China. It is dominated by perennial bunchgrass, ranging from forest steppe to semi-desert steppe and into the montane regions of Tibet.	This type extends from Kazakhstan to China, covering much of Mongolia and parts of central China.

Formation	D_Key	Division	Description	Geographic Range
	Dnew	**2.C.1.Pd Northeast Asian Grassland & Shrubland**	Information not available.	
2.C.2 Boreal Grassland, Meadow & Shrubland				
	D025	**2.C.2.Na North American Boreal Grassland, Meadow & Shrubland**	The North American Boreal Grassland, Meadow & Shrubland forms scattered occurrences throughout the boreal region of Canada and the U.S., is more strongly shrubby throughout the main region, and more commonly grassland as it transitions into temperate vegetation. Vegetation and ecology of this type are poorly understood.	This type is found scattered through the boreal region of Canada and the United States.
	D new	**2.C.2.Pa. Eurasian Boreal Grassland, Meadow & Shrubland**	The Eurasian Boreal Grassland, Meadow & Shrubland forms scattered occurrences throughout the boreal region of Europe and Russia. The vegetation and ecology of this type are poorly understood.	This type is found scattered through the boreal region of Europe and Russia.
3.A.1 Warm Semi-Desert Scrub & Grassland				
	[grasslands often minor, or have low productivity, so not treated here]			
3.B.1 Cool Semi-Desert Scrub & Grassland				
	D040	**3.B.1.Na Western North American Cool Semi-Desert Scrub & Grassland**	The Western North American Cool Semi-Desert occupies the lower elevations of the basins, valleys, lower plateaus, foothils, and lower mountain slopes of the intermountain, or Great Basin, region of western North America. Most of the area is relatively well-vegetated semi-desert scrub or shrub steppe. Woody species of *Artemisia* are the most characteristic and widespread vegetation dominants, including four subspecies of *Artemisia tridentata* (ssp. *tridentata, wyomingensis, vaseyana, xericensis*).	This type occupies the lower elevations of the intermountain, or Great Basin, region of western North America, almost entirely in the United States, with relatively small areas northward in British Columbia, Canada.
	D new	**3.B.1.Pa Eastern Eurasian Cool Semi-Desert Scrub & Grassland**	The Eastern Eurasian Cool Semi-Desert, or steppe, is found through Mongolia and China. The deserts of Outer Mongolia change gradually, going northward into desert steppe and then into steppes. The Tibetan Plateau, roughly 3000 km in length with a mean elevation of 4000 m, forms an effective barrier to moist air moving northward from the Indian Ocean. Chinese steppes have an east-west zonation similar to North American prairie and unlike the steppes of western Eurasia. The major types are moist meadow-steppe, typical-steppe, and desert-steppe, respectively.	These semi-deserts cover large parts of China, extending to the middle of the Kwang Ho (Yellow River) in the East. The Gobi Desert lies in (outer) Mongolia and mainland China's Inner Mongolia.

Formation	D_Key	Division	Description	Geographic Range
	D new	**3.B.1.Pb Western Eurasian Cool Semi-Desert Scrub & Grassland**	The Western Eurasian Cool Semi-Desert, often called steppe, stretches across the Eurasian continent from eastern Europe into western China. It forms a continuous belt west of the Urals, but become fragmented in the large basins east of these mountains, which are an unofficial boundary between Europe and Asia. Latitude plays a key role in differentiating the various types of steppe and soils. The main factor that changes from north to south is total annual precipitation, higher in the north and lower toward the south. The northern steppe region is a zone of transition known as forest-steppe, where meadow-steppe alternates with patches of forest. Parallel to forest-steppe and immediately south of it lies true steppe, a vegetation rich in perennial forbs and grasses. The next zone is a drier steppe of drought-tolerant bunchgrasses and perennial forbs. Toward the southern limits of the biome, dry bunchgrass steppes are dotted with dwarf shrubs and grade into true desert. Throughout the steppes, the dominant grasses are perennial bunchgrasses. The Ural Mountains represent a boundary not only between climates but also between	This type stretches across the Eurasian continent from eastern Europe into western China.
	D new	**3.B.1.Ea Patagonian Cool Semi-Desert Scrub & Grassland**	Patagonia lies between 39° and 55°S, partly in Chile but mainly in Argentina; its extra-Andean portion is treeless semi -arid grass and shrub steppes that have been grazed by domestic livestock for a little over a century. The climate is arid to semi-arid, and cool to cold. This region is dominated by graminoids with distribution further north in the Andes (Festuca, Stipa, Poa, Deyeuxia) and other species such as Nassauvia axilaris, Senecio filaginoides, in addition to a series of endemic genera	Southern Chile and Argentina
4.B.1	**Alpine Scrub, Forb Meadow & Grassland**			
	D042	**4.B.1.Na Eastern North American Alpine Scrub, Forb Meadow & Grassland**	The Eastern North American Alpine type is found in small occurrences from the Torngat mountains in Labrador south the the Adirondack and northern Appalachian mountains of New York and New England, United States. The vegetation varies from tree-line forests and kummholz to dwarf-shrub, meadow, and grassland.	This type occurs in isolated regions of the Adirondacks, and on sveral peaks in the Green and White Mountains in the Northern Appalachian region, the Long Range of Newfoundland, and the Torngat Mountains of Labrador.
	D043	**4.B.1.Nb Western North American Alpine Scrub, Forb Meadow & Grassland**	The Western North American Alpine type is found from the Alaskan mountain ranges down through through the Cascade-Sierras of California and through the Rockies into Mexico and Guatemala.	This type occurs from the arctic Brooks Range in Alaska, southward through the Alaska Range, the Wrangells, and the Chugach Mountains of coastal Alaska, from there southward on hundreds of montane "islands," on the Coastal Cordillera from the Alaska Range to the Sierra Nevada of California and the Rocky Mountains from the Brooks Range to the higher peaks of northern New Mexico and Arizona, then isolated appearances in the Sierra Madre Oriental of Mexico, and even in Guatemala, before become transitioning to tropical "paramo-like" vegetation.
	Dnew	**4.B.1.Pa European Alpine Scrub, Forb Meadow & Grassland**	The European Alpine type is found above the tree line, characteristically formed by extensive belts of dwarf-shrub heaths, but extending into the subalpine as cleared meadows.	This type is most common in the Alps, but is found in Iceland, Scotland, Scandinavia, the Urals, and Siberian ranges.

Formation	D_Key	Division	Description	Geographic Range
	Dnew	**4.B.1.Pb Central Asian Alpine Scrub, Forb Meadow & Grassland**	The Central Asian Alpine type is primarily located on the Tibetan plateau but may be elsewhere. The vegetation varies from tree-line forests to shrub, meadow, and grassland. The climate is characterised by long, cold winters, and short, relatively cool summers.	Much of the alpine is found on the Tibetan plateau, but may be elsewhere.
	Dnew	**4.B.1.La Australian Alpine Scrub, Forb Meadow & Grassland**	The alpine and subalpine areas are found in the Central Plateau of Tasmania and the Snowy Mountains of New South Wales, above an altitude of about 1370 to 1525 m on the Australian mainland and above about 915 m in Tasmania. The vegetation varies from subalpine woodland of Eucalyptus, with a heath or grassy understory, to heath-grass vegetation or tussock grassland / tall alpine herbfield, and short alpine herbfields.	The alpine and subalpine areas are found in the Central Plateau of Tasmania and the Snowy Mountains of New South Wales.
	Dnew	**4.B.1.Lb New Zealand Alpine Scrub, Forb Meadow & Grassland**	The New Zealand Alpine type is is found almost entirely in the South Island mountains of New Zealand. Vegetation varies from alpine grasslands, to stony herbfields and mobile screes and rock barrens.	This type is found almost entirely in the South Island mountains of New Zealand.

Formation	D_Key	Division	Number of Studies Reporting Species Richness per Range in Unit Area, and the Average Richness across these Studies (note that this Average presents an "average of averages" and does not show full range of variation on a plot basis)										Comment
			1–9 m^2	Average (range)	10–29 m^2	Average (range)	30–100 m^2	Average (range)	101–1,000 m^2	Average (range)	1,001–10,000 m^2	Average (range)	
2.A.1 Tropical Lowland Shrubland, Grassland & Savanna													
		2.A.1.Ea Central American- Caribbean Lowland Shrubland, Grassland & Savanna					1	9					
		2.A.1.Eb Amazonian Shrubland and Savanna											
		2.A.1.Ec Guayana Shrubland and Savanna									1	29	
		2.A.1.Ed Parana Brazilian Shrubland and Savanna	1	17			1	22					
		2.A.1.Ee Chacoan Shrubland and Savanna											
		2.A.1.Ff West-Central African Mesic Woodland and Savanna					2	49 (33–65)					

Formation	D_Key	Division	Number of Studies Reporting Species Richness per Range in Unit Area, and the Average Richness across these Studies (note that this Average presents an "average of averages" and does not show full range of variation on a plot basis)										Comment
			1–9 m^2	Average (range)	10–29 m^2	Average (range)	30–100 m^2	Average (range)	101–1,000 m^2	Average (range)	1,001–10,000 m^2	Average (range)	
		2.A.1.Fg Eastern and Southern African dry savanna and woodland	1	5									
		2.A.1.Fh Mopane Savanna							1	75			
		2.A.1.Fi Sudano Sahelian Dry Savanna							1	53			
		2.A.1.Ij Indomalayan Mesic Savanna and Grasslands											
		2.A.1.Lk Australian Tropical Savanna									1	27	
		2.A.1.Ol Polynesian Lowland Shrubland, Grassland & Savanna							1	12			

Formation	D_Key	Division	Number of Studies Reporting Species Richness per Range in Unit Area, and the Average Richness across these Studies (note that this Average presents an "average of averages" and does not show full range of variation on a plot basis)										Comment
			1–9 m^2	Average (range)	10–29 m^2	Average (range)	30–100 m^2	Average (range)	101–1,000 m^2	Average (range)	1,001–10,000 m^2	Average (range)	
		2.A.1.Om Eastern Melanesian Lowland Shrubland, Grassland & Savanna											
2.A.2 Tropical Montane Shrubland, Grassland & Savanna													
		2.A.2.Ea Tropical Andes Shrubland and Grassland	2	21 (16 to 25)					1	21			
		2.A.2.Eb Caribbean and Central American Montane Shrubland and Grassland											
		2.A.2.Ec Guayanan Montane Shrubland and Grassland											
		2.A.2.Ed Parana Brazilian Montane Shrubland and Savanna											
		2.A.2.Fe African montane grassland and shrubland									1	30	
		2.A.2.Ff African (Madagascan) montane grassland and shrubland			1	18 (13 to 27)							
		2.A.2.If Indomalayan Montane Meadow	1	13					1	51			
		2.A.2.Lg New Guinea Montane Meadow							1	21			
	D076	**2.A.2.Oh Polynesian Montane Shrubland, Grassland & Savanna**											

Formation	D_Key	Division	Number of Studies Reporting Species Richness per Range in Unit Area, and the Average Richness across these Studies (note that this Average presents an "average of averages" and does not show full range of variation on a plot basis)										Comment
			1–9 m^2	Average (range)	10–29 m^2	Average (range)	30–100 m^2	Average (range)	101–1,000 m^2	Average (range)	1,001–10,000 m^2	Average (range)	
		2.A.2.Oi Eastern Melanesian Montane Shrubland, Grassland & Savanna											
2.B.2 Mediterranean Grassland & Forb Meadow													
	D021	**2.B.2.Na California Grassland & Meadow**	4	15 (14 to 17)					2	50 (49–50)			
	Dnew	**2.B.2.Px Mediterranean Basin Dry Grassland**							1	52 (42–61)			
	Dnew	**2.B.2.Pc Mediterranean Basin Montane Grassland & Scrub**											
	D new	**2.B.1.Ea Chilean Mediterranean Scrub**											
	D new	**2.B.1.Fb South African Cape Mediterranean Scrub**											
	D new	**2.B.1.La Australian Mediterranean Scrub**											
2.C.1 Temperate Grassland, Meadow & Shrubland													
		2.C.1.Ea Pampas Grassland & Shrubland							1	18			
		2.C.1.Eb Southern Andean Shrubland and Grassland					1	15					

Formation	D_Key	Division	Number of Studies Reporting Species Richness per Range in Unit Area, and the Average Richness across these Studies (note that this Average presents an "average of averages" and does not show full range of variation on a plot basis)										Comment
			1–9 m^2	Average (range)	10–29 m^2	Average (range)	30–100 m^2	Average (range)	101–1,000 m^2	Average (range)	1,001–10,000 m^2	Average (range)	
		2.C.1.Fc Southern African Montane Grassland					1 (only range provided)	24	1 (only range provided)	78			Represents Very High levels of richness
	Dnew	**2.C.1.La Australian Temperate Grassland & Shrubland**					5 (excluded disturbed types)	37 (30–45)					
	Dnew	**2.C.1.Lb New Zealand Grassland & Shrubland**					3	34 (30–37)					
	D022	**2.C.1.Na Vancouverian & Rocky Mountain Grassland & Shrubland**	3	9 (8–9)					3	35 (34–36)			
	D023	**2.C.1.Nb Great Plains Grassland & Shrubland**							8	43 (33–49)	6	64 (39 to 77)	

Formation	D_Key	Division	Number of Studies Reporting Species Richness per Range in Unit Area, and the Average Richness across these Studies (note that this Average presents an "average of averages" and does not show full range of variation on a plot basis)										Comment
			1–9 m^2	Average (range)	10–29 m^2	Average (range)	30–100 m^2	Average (range)	101–1,000 m^2	Average (range)	1,001–10,000 m^2	Average (range)	
	D024	**2.C.1.Nc Eastern North American Grassland, Meadow & Shrubland**	6 (2.5 m^2 plot)	39 (31 to 47)	6 (25 m^2 plot)	50 (43 to 57)			6 (625 m2 plot)	67 (54 to 79)			Represents Very High levels of richness
	D061	**2.C.1.Nd Western North America Interior Sclerophyllous Chaparral Shrubland**											
	D102	**2.C.1.Ne Southeastern North American Grassland & Shrubland**											
	Dnew	**2.C.1.Pa European Grassland & Heath**	8	31 (21 to 39)	2 (plot ranged from 4 m^2 to 16 m^2)	22 (17 to 27)	8	49 (45 to 59)					
	Dnew	**2.C.1.Pb Western Eurasian Grassland & Shrubland**											
	Dnew	**2.C.1.Pc Eastern Eurasian Grassland & Shrubland**	2	18 (16 to 20)									

Formation	D_Key	Division	Number of Studies Reporting Species Richness per Range in Unit Area, and the Average Richness across these Studies (note that this Average presents an "average of averages" and does not show full range of variation on a plot basis)										Comment
			1–9 m^2	Average (range)	10–29 m^2	Average (range)	30–100 m^2	Average (range)	101–1,000 m^2	Average (range)	1,001–10,000 m^2	Average (range)	
	Dnew	2.C.1.Pd Northeast Asian Grassland & Shrubland											
2.C.2 Boreal Grassland, Meadow & Shrubland													
	D025	2.C.2.Na North American Boreal Grassland, Meadow & Shrubland											
	D new	2.C.2.Pa. Eurasian Boreal Grassland, Meadow & Shrubland	1	63									
3.A.1 Warm Semi-Desert Scrub & Grassland													
	[grasslands often minor, or have low productivity, so not treated he												
3.B.1 Cool Semi-Desert Scrub & Grassland													
	D040	3.B.1.Na Western North American Cool Semi-Desert Scrub & Grassland							3	23 (20–28)			
	D new	3.B.1.Pa Eastern Eurasian Cool Semi-Desert Scrub & Grassland											

Formation	D_Key	Division	Number of Studies Reporting Species Richness per Range in Unit Area, and the Average Richness across these Studies (note that this Average presents an "average of averages" and does not show full range of variation on a plot basis)										Comment
			1–9 m^2	Average (range)	10–29 m^2	Average (range)	30–100 m^2	Average (range)	101–1,000 m^2	Average (range)	1,001–10,000 m^2	Average (range)	
	D new	**3.B.1.Pb Western Eurasian Cool Semi-Desert Scrub & Grassland**	2	9 (8–10)									
	D new	**3.B.1.Ea Patagonian Cool Semi-Desert Scrub & Grassland**											
4.B.1	**Alpine Scrub, Forb Meadow & Grassland**												
	D042	**4.B.1.Na Eastern North American Alpine Scrub, Forb Meadow & Grassland**											
	D043	**4.B.1.Nb Western North American Alpine Scrub, Forb Meadow & Grassland**											
	Dnew	**4.B.1.Pa European Alpine Scrub, Forb Meadow & Grassland**	1	9	4	36 (19–53)	2	68 (67–69)					Represents Very High Levels of Richness

Formation	D_Key	Division	Number of Studies Reporting Species Richness per Range in Unit Area, and the Average Richness across these Studies (note that this Average presents an "average of averages" and does not show full range of variation on a plot basis)										Comment
			1–9 m^2	Average (range)	10–29 m^2	Average (range)	30–100 m^2	Average (range)	101–1,000 m^2	Average (range)	1,001–10,000 m^2	Average (range)	
	Dnew	**4.B.1.Pb Central Asian Alpine Scrub, Forb Meadow & Grassland**	2	15 (11–18)	1	28							
	Dnew	**4.B.1.La Australian Alpine Scrub, Forb Meadow & Grassland**											
	Dnew	**4.B.1.Lb New Zealand Alpine Scrub, Forb Meadow & Grassland**											

Species Richness_Tropical

Division	Macrogroup	System	Citation	Year(s) of sampling (e.g., 1922–23)	Land-Use History (if provided)	Treatment (if applicable)	Study Area	Study Design	Grassland Type
2.A.1.Ea. Central American-Caribbean Grassland, Savanna & Shrubland Division	Orinoquian Savanna	CES405.487 Sabanas Estacionales del Piedemonte de los Llanos del Orinoco	Sarmiento, G. 1983. Patterns of specific and phenological diversity in the grass community of the Venezuelan tropical savannas. Journal of Biogeography 10: 373-391.		extensive cattle grazing and normal fire regime			Plots stratified by soils and geology. Savanna varied from open to somewhat closed, but graminoids had ~100% cover	Western Llanos (Piedmont savannas)
2.A.1.Eb Amazonian Shrubland and Savanna	Southcentral Amazon Savanna		Magnusson, W.E., A.P. Lima, A.L.K. Albernaz, T.M. Sanaiotti, e J.L Guillaumet. 2008. Composição florística e cobertura vegetal das savanas na região de Alter do Chão, Santarém – Para. Revista	1998	yearly fires		30,000 ha	Transects distributed to cover most of area. 38 sets each of 4 - 250 m^2 transects	Savanna Amazonica
2.A.1.Ec Guayana Shrubland and Savanna	Central Guayana Shrubland and Savanna	CES404.383 Sabana Abierta de Rupununi-Rio Branco	Barbosa, R.I., S. Pereira, P. Figueiredo, F. da Silva. 2005. Notas sobre a composição arbóreo-arbustiva de uma fisionomia das savanas de Roraima, Amazônia Brasileira. Acta Bot. Bras. vol.19 no.2. São Paulo	2003			39,800 km^2	3 areas, 3- 0.1ha plot /area for a total of 9,000 m^2 sampled	Open savanna of Savannas of Roraima
2.A.1.Ec Guayana Shrubland and Savanna	Central Guayana Shrubland and Savanna	CES404.383 Sabana Abierta de Rupununi-Rio Branco	Miranda, I.S. e M.L. Absy. 2000. Fisionomia das savanas de Roraima, Brasil. Acta Amazonica 30: 423-440				39,800 km^2	45 plots of 0.15 ha were distributed in the region along access roads	Savannas of Roraima
2.A.1.Ed Parana Brazilian Shrubland and Savanna	Cerrado Shrubland and Savanna	CES406.511 Sabanas Pastizales del Cerrado	Munhoz, C.B.R., J.M. Felfili, and C. Rodrigues. 2008. Species-environment relationship in the herb-subshrub layer of a moist Savanna site, Federal District, Brazil. Braz. J. Biol. vol.68 no.1	1999–2000			16 ha	Line intercept method, 4 transects of 40m, 25m, 30m, and 25m	Moist open grassland (Campo limpo umido)

Division	Macrogroup	System	Citation	Year(s) of sampling (e.g., 1922–23)	Land-Use History (if provided)	Treatment (if applicable)	Study Area	Study Design	Grassland Type
2.A.1.Ed Parana Brazilian Shrubland and Savanna	Cerrado Shrubland and Savanna	CES406.507 Sabanas Arbustivas del Cerrado	Batalha, M.A., W. Mantovani, and H.M. Mesquita Junior. 2001. Vegetation structure in Cerrado physiognomies in southeastern Brazil. Braz. J. Biol. vol.61 no.3: 475-483	1996	site protected from fire		1,225 ha	30 plots, 10 in each of three vegetation types	Only the 10 samples in Woody savanna (campo cerrado) are included in this table
2.A.1.Ed Parana Brazilian Shrubland and Savanna	Cerrado Shrubland and Savanna	CES406.507 Sabanas Arbustivas del Cerrado	Batalha, M.A., W. Mantovani, and H.M. Mesquita Junior. 2001. Vegetation structure in Cerrado physiognomies in southeastern Brazil. Braz. J. Biol. vol.61 no.3: 475-483	1996	site protected from fire		1,225 ha	30 plots, 10 in each of three vegetation type	Only the 10 samples in Woody savanna (campo cerrado) are included in this table
2.A.1.Ff West-Central African Mesic Woodland and Savanna	Western Africa Mesic Woodland and Grassland		Orthmann, B. 2005. Vegetation ecology of a woodland-savanna mosaic in central Benin (West Africa). Ph.D. Dissertation, Universität Rostock, Germany	2001–2002	Fires, grazing and selective logging		3 km^2	Stratified sampling based on vegetation types	Tree savanna in West Africa woodland-savanna mosaic
2.A.1.Ff West-Central African Mesic Woodland and Savanna	Western Africa Mesic Woodland and Grassland		Orthmann, B. 2005. Vegetation ecology of a woodland-savanna mosaic in central Benin (West Africa). Ph.D. Dissertation, Universität Rostock, Germany	2001–2002	Fires, grazing and selective logging		3 km^2	Stratified sampling based on vegetation types	Open savanna in West Africa woodland-savanna mosaic
2.A.1.Fg Eastern and Southern African dry savanna and woodland	Kalahari Camel Thorn Woodland and Savanna		Rutherford, M.C., et al. Savanna Biome in Mucina, L. & Rutherford, M.C. (eds.) 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. SANBI, Pretoria						Eastern Kalahari bushveld
2.A.1.Fg Eastern and Southern African dry savanna and woodland	Dry Combretum-mixed Woodland and Savanna		Soromessa, T., D. Teketay, and S. Demissew. 2004. Ecological study of the vegetation in Gamo Gofa zone, southern Ethiopia. Tropical Ecology 45(2): 209-221					Stratified sampling based on vegetation physiognomy in two separated sites	Savanna woodland

Division	Macrogroup	System	Citation	Year(s) of sampling (e.g., 1922–23)	Land-Use History (if provided)	Treatment (if applicable)	Study Area	Study Design	Grassland Type
2.A.1.Fh Mopane Savanna	Limpopo Mopane		Rutherford, M.C., et al. Savanna Biome in Mucina, L. & Rutherford, M.C. (eds.) 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. SANBI, Pretoria						Mopane
2.A.1.Fi Sudano Sahelian Dry Savanna	Sudano Sahelian Treed Savanna		NEZˇERKOVÁ-HEJCMANOVÁ, P., et al. 2005. Analysis of the herbaceous undergrowth of the woody savanna in the Fathala reserve, Delta du Saloum National Park (Senegal). Belg. Journ. Bot. 138 (2) : 119-128	2003	Fenced reserve since 2000. Fires and grazing by native game		2,000 ha	Stratified sampling based on vegetation types, 30 plots of 25 m2	Wooded grassland
2.A.1.Lk Australian Tropical Savanna	Australian Tallgrass Savanna		Neldner, V.J., R.J. Fensham, J.R. Clarkson, and J.P. Stanton. 1997. The natural grasslands of Cape York peninsula, Australia. Description, distribution and conservation status. Biological Conservation 81:121-136	1990–1994			7,276 km^2	72–500 m^2 blocks distributed across study area	Natural grasslands of Cape York peninsula
2.A.1.Lk Australian Tropical Savanna	Australian Tallgrass Savanna		Neldner, V.J., R.J. Fensham, J.R. Clarkson, and J.P. Stanton. 1997. The natural grasslands of Cape York peninsula, Australia. Description, distribution and conservation status. Biological Conservation 81:121-136	1990–1994			7,276 km^2	72–500 m^2 blocks distributed across study area	Natural grasslands of Cape York peninsula
2.A.1.Ol Polynesian Lowland Shrubland, Grassland & Savanna	Micronesian Lowland Shrubland, Grassland & Savanna		Vegetation plots of U.S. National Park Service vegetation classification and mapping program.		Islands impacted by war effects			12.62 radius in circular plots	Lowland grassland

Division	Macrogroup	System	Citation	Year(s) of sampling (e.g., 1922–23)	Land-Use History (if provided)	Treatment (if applicable)	Study Area	Study Design	Grassland Type
2.A.2.Ea Tropical Andes Shrubland and Grassland	Andean Paramo Upper Montane Grassland and Shrubland	CES409.123 Pajonal Altimontano y Montano Paramuno	Keating, P.H. 1999. Changes in Paramo vegetation along an elevation gradient in southern Ecuador. Journal of the Torrey Botanical Society 126(2):159-175				1.8 ha	Selected homogeneous habitat type where a central reference stake was established and plots where located based on a random number generator for distance from central stake	Grass paramo
2.A.2.Ea Tropical Andes Shrubland and Grassland	Andean Paramo Upper Montane Grassland and Shrubland	CES409.124 Pajonal Arbustivo Altimontano Paramuno	Keating, P.H. 1999. Changes in Paramo vegetation along an elevation gradient in southern Ecuador. Journal of the Torrey Botanical Society 126(2):159-175				1.8 ha	Selected homogeneous habitat type where a central reference stake was established and plots where located based on a random number generator for distance from central stake	Shrub paramo
2.A.2.Ea Tropical Andes Shrubland and Grassland	Dry Puna Scrub and Grassland	CES505.028 Pajonales y Matorrales Altoandinos de la Puna Xerofítica Norte	Navarro, G. and M. Maldonado. 2002. Geografia Ecologica de Bolivia. Centro de Ecologia Simon I. Patiño						Tolares altiplanicos
2.A.2.Fe African montane grassland and shrubland	AfroMontane Grassland		Shibru, S. and Z. Woldu. 2006. Comparative floristic study on Mt. Alutu and Mt. Chubbi along an altitudinal gradient. Journal of the Drylands 1(1): 8-14					Transects in two separated mountains along elevation gradient with plots each 50 m elev. 72 plots in total	Montane shrubland and grassland

Division	Macrogroup	System	Citation	Year(s) of sampling (e.g., 1922–23)	Land-Use History (if provided)	Treatment (if applicable)	Study Area	Study Design	Grassland Type
2.A.2.Ff African (Madagascar) montane grassland and shrubland	Madagascan High Montane Grassland		Bloesch, U., A. Bosshard, P. Schachenmann, H. Rabetaliana Schachenmann, and F. Klötzi. 2002. Biodiversity of the Subalpine forest-grassland ecotone of the Andringitra Massif, Madagascar. Pp 165-175. *In* Ch. Körner and E.M. Spehn. Mountain Biodiversity: A global assessment. The Parthenon Publishing Group. Washington DC.	1996?	Wildfires as a natural factor, but increased fire over last 300 yrs, then clearing for charcoal, with moderate cattle grazing.		Nature Preserve is 31,000 ha	110 25 m^2 releves were distributed throughout and 14 types were classified according to Braun-Blanquet methods. Five of the types are labelled as "mountain meadow" (types 6–10) and one as "shrubby meadow" (type 11)	Type 6
2.A.2.Ff African (Madagascar) montane grassland and shrubland	Madagascan High Montane Grassland		Bloesch, U. A. Bosshard, P. Schachenmann, H. Rabetaliana Schachenmann and F. Klötzi. 2002. Biodiversity of the Subalpine forest-grassland ecotone of the Andringitra Massif, Madagascar. Pp 165-175. *In* Ch. Körner and E.M. Spehn. Mountain Biodiversity: A global assessment. The Parthenon Publishing Group. Washington DC.	1996?	Wildfires as a natural factor, but increased fire over last 300 yrs, then clearing for charcoal, with moderate cattle grazing.		Nature Preserve is 31,000 ha	110 25 m^2 releves were distributed throughout and 14 types were classified according to Braun-Blanquet methods. Five of the types are labelled as "mountain meadow" (types 6–10) and one as "shrubby meadow" (type 11)	Type 7

Division	Macrogroup	System	Citation	Year(s) of sampling (e.g., 1922–23)	Land-Use History (if provided)	Treatment (if applicable)	Study Area	Study Design	Grassland Type
2.A.2.Ff African (Madagascar) montane grassland and shrubland	Madagascan High Montane Grassland		Bloesch, U. A. Bosshard, P. Schachenmann, H. Rabetaliana Schachenmann and F. Klötzi. 2002. Biodiversity of the Subalpine forest-grassland ecotone of the Andringitra Massif, Madagascar. Pp 165-175. *In* Ch. Körner and E.M. Spehn. Mountain Biodiversity: A global assessment. The Parthenon Publishing Group. Washington DC.	1996?	Wildfires as a natural factor, but increased fire over last 300 yrs, then clearing for charcoal, with moderate cattle grazing.		Nature Preserve is 31,000 ha	110 25 m^2 releves were distributed throughout and 14 types were classified according to Braun-Blanquet methods. Five of the types are labelled as "mountain meadow" (types 6–10) and one as "shrubby meadow" (type 11)	Type 8
2.A.2.Ff African (Madagascar) montane grassland and shrubland	Madagascan High Montane Grassland		Bloesch, U. A. Bosshard, P. Schachenmann, H. Rabetaliana Schachenmann and F. Klötzi. 2002. Biodiversity of the Subalpine forest-grassland ecotone of the Andringitra Massif, Madagascar. Pp 165-175. *In* Ch. Körner and E.M. Spehn. Mountain Biodiversity: A global assessment. The Parthenon Publishing Group. Washington DC.	1996?	Wildfires as a natural factor, but increased fire over last 300 yrs, then clearing for charcoal, with moderate cattle grazing.		Nature Preserve is 31,000 ha	110 25 m^2 releves were distributed throughout and 14 types were classified according to Braun-Blanquet methods. Five of the types are labelled as "mountain meadow" (types 6–10) and one as "shrubby meadow" (type 11)	Type 9

Division	Macrogroup	System	Citation	Year(s) of sampling (e.g., 1922–23)	Land-Use History (if provided)	Treatment (if applicable)	Study Area	Study Design	Grassland Type
2.A.2.Ff African (Madagascar) montane grassland and shrubland	Madagascan High Montane Grassland		Bloesch, U. A. Bosshard, P. Schachenmann, H. Rabetaliana Schachenmann and F. Klötzi. 2002. Biodiversity of the Subalpine forest-grassland ecotone of the Andringitra Massif, Madagascar. Pp 165-175. *In* Ch. Körner and E.M. Spehn. Mountain Biodiversity: A global assessment. The Parthenon Publishing Group. Washington DC.	1996?	Wildfires as a natural factor, but increased fire over last 300 yrs, then clearing for charcoal, with moderate cattle grazing.		Nature Preserve is 31,000 ha	110 25 m^2 releves were distributed throughout and 14 types were classified according to Braun-Blanquet methods. Five of the types are labelled as "mountain meadow" (types 6–10) and one as "shrubby meadow" (type 11)	Type 10
2.A.2.Ff African (Madagascar) montane grassland and shrubland	Madagascan High Montane Grassland		Bloesch, U., A. Bosshard, P. Schachenmann, H. Rabetaliana Schachenmann, and F. Klötzi. 2002. Biodiversity of the Subalpine forest-grassland ecotone of the Andringitra Massif, Madagascar. Pp 165-175. *In* Ch. Körner and E.M. Spehn. Mountain Biodiversity: A global assessment. The Parthenon Publishing Group. Washington DC.	1996?	Wildfires as a natural factor, but increased fire over last 300 yrs, then clearing for charcoal, with moderate cattle grazing.		Nature Preserve is 31,000 ha	110 25 m^2 releves were distributed throughout and 14 types were classified according to Braun-Blanquet methods. Five of the types are labelled as "mountain meadow" (types 6–10) and one as "shrubby meadow" (type 11)	Type 11
2.A.2.Lg New Guinea Montane Meadow	Central Range Subalpine Grasslands		Smith, J.M.B. 1977. Vegetation and Microclimate of East- and West-Facing Slopes in the Grasslands of MT Wilhelm, Papua New Guinea. Journal of Ecology, Vol. 65, No. 1: 39-53	1975	mostly natural but some conversion			10 Transects of 10- 4 m2 plots located at paired sites at selected altitudes	Montane grassland
2.A.2.Lg New Guinea Montane Meadow	Central Range Subalpine Grasslands		Smith, J.M.B. 1977. Vegetation and Microclimate of East- and West-Facing Slopes in the Grasslands of MT Wilhelm, Papua New Guinea. Journal of Ecology, Vol. 65, No. 1: 39-53	1975	mostly natural but some conversion			10 Transects of 10 - 4 m^2 plots located at paired sites at selected altitudes	Montane grassland

Division	Macrogroup	System	Citation	Year(s) of sampling (e.g., 1922–23)	Land-Use History (if provided)	Treatment (if applicable)	Study Area	Study Design	Grassland Type
2.A.2.Oh Polynesian Montane Shrubland, Grassland & Savanna	Hawai'ian Montane Shrubland, Grassland & Savanna		Jacobi, J.D. 1981. Cooperative National Park Resources Studies Unit University of Hawaii at Manoa. Technical Report 41	1973	Grazing by native and introduced animals		120 ha	3 transects of 1,000 m with plots each 20 m	Upland native grassland

Division	Unit Area (m^2)	spatial distribution of unit	# of units	Richness comment	Richness/unit area	Standard Deviation	Standard Eerror	Reported range of richness	Sampled Growth Form	Other comments
2.A.1.Ea. Central American-Caribbean Grassland, Savanna & Shrubland Division	100 m^2		50		9	2		4 to 13	perennial grasses	
2.A.1.Eb Amazonian Shrubland and Savanna	38,000 m^2	scattered			130				all vascular species	
2.A.1.Ec Guayana Shrubland and Savanna	3,000 m^2	scattered	3	species/ area leveled off	29			12 to 20	woody species	savanna with termite mounds
2.A.1.Ec Guayana Shrubland and Savanna	67,500 m^2	scattered			195				herb spp	herbs were collected in a gradient of savanna types from open grassland to woodland
2.A.1.Ed Parana Brazilian Shrubland and Savanna	see other comments	contiguous		species/area leveled off at each transect's length				27 to 45	only herbs and subshrubs	40 m = 29 spp, 25 m = 40 spp, 30 = 45 spp, 25 m = 27spp

Division	Unit Area (m^2)	spatial distribution of unit	# of units	Richness comment	Richness/unit area	Standard Deviation	Standard Eerror	Reported range of richness	Sampled Growth Form	Other comments
2.A.1.Ed Parana Brazilian Shrubland and Savanna	40 m^2		10		21.9	5.4			only shrubs and trees	
2.A.1.Ed Parana Brazilian Shrubland and Savanna	2.5 m^2		10		16.9	6.01			only herbs and subshrubs	
2.A.1.Ff West-Central African Mesic Woodland and Savanna	75 m^2		4		65			53 to 77	herb layer (includes trees seedlings)	
2.A.1.Ff West-Central African Mesic Woodland and Savanna	75 m^2		6		33			26 to 42	herb layer (includes trees seedlings)	
2.A.1.Fg Eastern and Southern African dry savanna and woodland	1 m^2		1200		5.1			3 to 14	all vascular species	
2.A.1.Fg Eastern and Southern African dry savanna and woodland	15,600 m^2	scattered			123				all vascular species	

Species Richness_Tropical

Division	Unit Area (m^2)	spatial distribution of unit	# of units	Richness comment	Richness/unit area	Standard Deviation	Standard Eerror	Reported range of richness	Sampled Growth Form	Other comments
2.A.1.Fh Mopane Savanna	1,000 m^2				75			50 to 93	all vascular species	
2.A.1.Fi Sudano Sahelian Dry Savanna	750 m^2	scattered	1		53				herbs	
2.A.1.Lk Australian Tropical Savanna	36,000 m^2	scattered	1		288				herb layer (includes trees seedlings)	excludes species with very low frequency
2.A.1.Lk Australian Tropical Savanna	2,500 m^2	scattered	3		27.3			18 to 38	herb layer (includes trees seedlings)	range of 18 to 26 to 38 represent types with same sampling size
2.A.1.Ol Polynesian Lowland Shrubland, Grassland & Savanna	500 m^2		4		11.5			5 to 16	all vascular species	

Species Richness_Tropical

Division	Unit Area (m^2)	spatial distribution of unit	# of units	Richness comment	Richness/unit area	Standard Deviation	Standard Eerror	Reported range of richness	Sampled Growth Form	Other comments
2.A.2.Ea Tropical Andes Shrubland and Grassland	6 m^2	scattered	25		23.8	0.97		13 to 33	all vascular species	
2.A.2.Ea Tropical Andes Shrubland and Grassland	6 m^2	scattered	16		25.9	1.26		18 to 33	all vascular species	
2.A.2.Ea Tropical Andes Shrubland and Grassland	500 m^2		1		21				all vascular species	
2.A.2.Fe African montane grassland and shrubland	9,600 m^2	scattered	1		30				all vascular species	only the 24 plots located > 2000 m altitude are included

Division	Unit Area (m^2)	spatial distribution of unit	# of units	Richness comment	Richness/unit area	Standard Deviation	Standard Eerror	Reported range of richness	Sampled Growth Form	Other comments
2.A.2.Ff African (Madagascar) montane grassland and shrubland	25 m^2		8		15.8		1.6		all vascular species	
2.A.2.Ff African (Madagascar) montane grassland and shrubland	25 m^2		8		13.8		1.7		all vascular species	

Division	Unit Area (m^2)	spatial distribution of unit	# of units	Richness comment	Richness/unit area	Standard Deviation	Standard Eerror	Reported range of richness	Sampled Growth Form	Other comments
2.A.2.Ff African (Madagascar) montane grassland and shrubland	25 m^2		9		17.6		1.6		all vascular species	
2.A.2.Ff African (Madagascar) montane grassland and shrubland	25 m^2		16		23.5		2.5		all vascular species	

Division	Unit Area (m^2)	spatial distribution of unit	# of units	Richness comment	Richness/unit area	Standard Deviation	Standard Eerror	Reported range of richness	Sampled Growth Form	Other comments
2.A.2.Ff African (Madagascar) montane grassland and shrubland	25 m2		9		21.7		2.5		all vascular species	
2.A.2.Ff African (Madagascar) montane grassland and shrubland	25 m^2		14		27.1		2.2		all vascular species	
2.A.2.Lg New Guinea Montane Meadow	4 m^2		600		12.9			10 to 17	all vascular species	
2.A.2.Lg New Guinea Montane Meadow	400 m^2	contiguous	6		50.6			37 to 68	all vascular species	

Species Richness_Tropical

Division	Unit Area (m^2)	spatial distribution of unit	# of units	Richness comment	Richness/unit area	Standard Deviation	Standard Eerror	Reported range of richness	Sampled Growth Form	Other comments
2.A.2.Oh Polynesian Montane Shrubland, Grassland & Savanna	600 m^2	scattered	1		21				all vascular species	

Species Richness_Temperate

Division	Macrogroup	System	Citation	Year(s) of sampling (e.g., 1922–1923)	Land-Use History (if provided)	Treatment (if applicable)
2.B.1.Fb South African Cape Mediterranean Scrub	Fynbos		Rebelo, A.G. et al.Fynbos Biome in Mucina, L. & Rutherford, M.C. (eds.) 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. SANBI, Pretoria			
2.B.1.Fb South African Cape Mediterranean Scrub	Fynbos		Rebelo, A.G. et al. In Mucina, L. & Rutherford, M.C. (eds.) 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. SANBI, Pretoria			
2.B.1.Fb South African Cape Mediterranean Scrub	Fynbos		Rebelo, A.G. et al. In Mucina, L. & Rutherford, M.C. (eds.) 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. SANBI, Pretoria			
2.B.2.Na California Grassland & Meadow	MG045 California Annual & Perennial Grassland		Safford, H.D. and S.P. Harrison. 2001. Grazing and Substrate interact to affect native vs exotic diversity in roadside grasslands. Ecological Applications 11: 1172-1122.	1999	grazed versus ungrazed on serpentine versus non-serpentine grasslands.	
2.B.2.Na California Grassland & Meadow	MG045 California Annual & Perennial Grassland		Safford, H.D. and S.P. Harrison. 2001. Grazing and Substrate interact to affect native vs exotic diversity in roadside grasslands. Ecological Applications 11: 1172-1122.			
2.B.2.Na California Grassland & Meadow	MG045 California Annual & Perennial Grassland		Safford, H.D. and S.P. Harrison. 2001. Grazing and Substrate interact to affect native vs exotic diversity in roadside grasslands. Ecological Applications 11: 1172-1122.			

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2.B.2.Na California Grassland & Meadow	MG045 California Annual & Perennial Grassland		Harrison, S., J. B. Grace, K.F. Davies, H.D. Safford, J.H. Viers. 2006. Invasion in a diversity hotspot: exotic cover and native richness in the California serpentine flora. Ecology 87: 695-703.	2001–2004		
2.B.2.Na California Grassland & Meadow	MG045 California Annual & Perennial Grassland		Heady, H.F., J.W. Bartolome, M.D. Pitt, G.D. Savelle and M.C. Stoud. 1992. California Prairie. Pg 313 - 335 In Coupland, R.T. Natural Grasslands: Introduction and Western Hemisphere. Elsevier, New York.			
2.B.2.Px Mediterranean Basin Dry Grassland	Mediterranean Basin Thero-Brachypodietea Perennial Dry Grassland		Houssard, C, J. Escarre and FR. Romane. 1980. Development of species diversity in some Meditteranean plant communities. Vegetatio 43:59-72	1977–1978	Old fields on abandoned vineyards and olive groves	
2.C.1.Ea Pampas Grassland & Shrubland	Semi Arid Pampas Grassland	CES602.027 Pastizales Sobre Suelos Franco-Arenosos de la Pampa Semiárida	Leon, R.J.C. & D.L. Anderson. 1983. El limite occidental del pastizal pampeano. Tuexenia 3: 67-83. Gottingen.		mowed in the past	
2.C.1.Ea Pampas Grassland & Shrubland	Humid Pampas Grassland	CES602.035 Pastizales de la Llanura Interserrana del Sur de la Región Pampeana	Batista, W.B., R.J.C. Leon & S.B Perelman. 1988. Las comunidades vegetales de un pastizal natural de la region de Laprida, Prov. Buenos Aires, Argentina. Phytocoenologia 16(4): 465-480	1983–1984	Samplig stratified between previously mowed and non-mowed sites	
2.C.1.Ea Pampas Grassland & Shrubland	Humid Pampas Grassland	CES602.035 Pastizales de la Llanura Interserrana del Sur de la Región Pampeana	Batista, W.B., R.J.C. Leon & S.B Perelman. 1988. Las comunidades vegetales de un pastizal natural de la region de Laprida, Prov. Buenos Aires, Argentina. Phytocoenologia 16(4): 465-480	1983–1984	Samplig stratified between previously mowed and non-mowed sites	

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2.C.1.Ea Pampas Grassland & Shrubland	Semi Arid Pampas Grassland	CES602.027 Pastizales Sobre Suelos Franco-Arenosos de la Pampa Semiárida	Leon, R.J.C. & D.L. Anderson. 1983. El limite occidental del pastizal pampeano. Tuexenia 3: 67-83. Gottingen.	1970	relict natural grassland	
2.C.1.Ea Pampas Grassland & Shrubland	Semi Arid Pampas Grassland	CES602.027 Pastizales Sobre Suelos Franco-Arenosos de la Pampa Semiárida	Leon, R.J.C. & D.L. Anderson. 1983. El limite occidental del pastizal pampeano. Tuexenia 3: 67-83. Gottingen.	1970	mowed in the past and overgrazed	
2.C.1.Ea Pampas Grassland & Shrubland	Semi Arid Pampas Grassland	CES602.027 Pastizales Sobre Suelos Franco-Arenosos de la Pampa Semiárida	Leon, R.J.C. & D.L. Anderson. 1983. El limite occidental del pastizal pampeano. Tuexenia 3: 67-83. Gottingen.	1970	mowed in the past	
2.C.1.Ea Pampas Grassland & Shrubland	Semi Arid Pampas Grassland	CES602.027 Pastizales Sobre Suelos Franco-Arenosos de la Pampa Semiárida	Leon, R.J.C. & D.L. Anderson. 1983. El limite occidental del pastizal pampeano. Tuexenia 3: 67-83. Gottingen.	1970	mowed in the past	
2.C.1.Eb Southern Andean Shrubland and Grassland	Southern Andes Montane Shrubland & Grassland	CES603.187 Pajonales Altimontanos y Altoandinos Andino-Templados	Ferreyra M., A. Cingolani, C. Ezcurra & D. Bran. 1998. High Andean vegetation and environmental gradients in northwestern Patagonia, Argentina. Journal of Vegetation Science 9 (3): 307-316.	1994		
2.C.1.Fc Southern African Montane Grassland	Sub-escarpment Grassland		Mucina, L. et al. Grassland Biome in Mucina, L. & Rutherford, M.C. (eds.) 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. SANBI, Pretoria			

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2.C.1.La Australian Grassland & Shrubland	Tussock Grassland		McIntyre, S. and T.G. Martin. 2001. Biophysical and human influences on plant species richness in grasslands: comparing variegated landscapes in subtropical and temperate regions. Austral Ecology 26:233-245	1997–1999	Landscape seting is subtropical grassy Eucalyptus woodlands, which have been cleared for pasture. Predominant grasses are native.	
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2.C.1.La Australian Grassland & Shrubland	Tussock Grassland		McIntyre, S. and T.G. Martin. 2001. Biophysical and human influences on plant species richness in grasslands: comparing variegated landscapes in subtropical and temperate regions. Austral Ecology 26:233-245	1997–1999	Landscape setting is New England Tablelands of New South Wales (see McIntyre, S. Z Huang, and A.P. Smith. 1993. Patterns of abundance in grassy vegetation of the New England Tablelands: identifying regional rarity in a threatened vegetation type. Austr. J. Botany 41:49-64.	
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2.C.1.Lb New Zealand Grassland & Shrubland	Chinochloa Tussock Grassland		Wardle, P. 1991. Vegetation of New Zealand. The BlackBurn Press, Caldwell, New Jersey, USA			
2.C.1.Lb New Zealand Grassland & Shrubland	Short-tussock Grassland		Wardle, P. 1991. Vegetation of New Zealand. The BlackBurn Press, Caldwell, New Jersey, USA			
2.C.1.Lb New Zealand Grassland & Shrubland	Maritme & Coastal Grassland		Wardle, P. 1991. Vegetation of New Zealand. The BlackBurn Press, Caldwell, New Jersey, USA			

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2.C.1.Na Vancouverian & Rocky Mountain Grassland & Shrubland	MG048 Northern Rocky Mountain-Vancouverian Montane & Foothill Grassland & Shrubland [3 sites from MG049 Southern Rocky Mountain Montane Grassland & Shrubland, also included]		Stohlgren, T.J., L.D. Schell, and B. Vanden Huevel. 1999. How grazing and soil quality affect native and exotic plant diversity in rocky mountain grasslands. Ecological Applications 9:45-64	1996, 1997	Details provided	
2.C.1.Na Vancouverian & Rocky Mountain Grassland & Shrubland	MG048 Northern Rocky Mountain-Vancouverian Montane & Foothill Grassland & Shrubland [3 sites from MG049 Southern Rocky Mountain Montane Grassland & Shrubland, also included]		Stohlgren, T.J., L.D. Schell, and B. Vanden Huevel. 1999. How grazing and soil quality affect native and exotic plant diversity in rocky mountain grasslands. Ecological Applications 9:45-64	1996, 1997	Details provided	
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2.C.1.Nb Great Plains Grassland & Shrubland	All Macrogroups		Stohlgren, T.J., K.A. Bull, and Y. Otsuki. 1998. Comparison of rangeland vegetation sampling techniques in the Central Grasslands	1996		

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2.C.1.Nb Great Plains Grassland & Shrubland	MG054 Great Plains Tallgrass Prairie & Shrubland		Stohlgren, T.J., K.A. Bull, and Y. Otsuki. 1998. Comparison of rangeland vegetation sampling techniques in the Central Grasslands	1996	no grazing. Burning on a 3–4 yr cycle.	
2.C.1.Nb Great Plains Grassland & Shrubland	MG051 Great Plains Mixedgrass Prairie & Shrubland		Stohlgren, T.J., K.A. Bull, and Y. Otsuki. 1998. Comparison of rangeland vegetation sampling techniques in the Central Grasslands	1996	various grazing intensities from heavily grazed to ungrazed sites	
2.C.1.Nb Great Plains Grassland & Shrubland	MG051 Great Plains Mixedgrass Prairie & Shrubland		Stohlgren, T.J., K.A. Bull, and Y. Otsuki. 1998. Comparison of rangeland vegetation sampling techniques in the Central Grasslands	1996	various grazing intensities from heavily grazed to ungrazed sites, grazing by native ungulates (bison, deer, elk).	
2.C.1.Nb Great Plains Grassland & Shrubland	MG053 Great Plains Shortgrass Prairie & Shrubland		Stohlgren, T.J., K.A. Bull, and Y. Otsuki. 1998. Comparison of rangeland vegetation sampling techniques in the Central Grasslands	1996	various grazing intensities from heavily grazed to ungrazed sites	
2.C.1.Nb Great Plains Grassland & Shrubland	MG054 Great Plains Tallgrass Prairie & Shrubland		Stohlgren, T.J., K.A. Bull, and Y. Otsuki. 1998. Comparison of rangeland vegetation sampling techniques in the Central Grasslands	1996	no grazing. Burning on a 3–4 yr cycle.	
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2.C.1.Nb Great Plains Grassland & Shrubland	MG053 Great Plains Shortgrass Prairie & Shrubland		Stohlgren, T.J., K.A. Bull, and Y. Otsuki. 1998. Comparison of rangeland vegetation sampling techniques in the Central Grasslands	1996	various grazing intensities from heavily grazed to ungrazed sites	
2.C.1.Nb Great Plains Grassland & Shrubland	MG054 Great Plains Tallgrass Prairie & Shrubland		Faber-Langendoen, D. and P.F. Maycock. 1987. Composition and soil-environment analysis of prairies on Walpole Island. Canadian Journal of Botany 65: 2410 - 2419	1981, 1982	Prairies are regularly burned by First Nations band. No grazing.	
2.C.1.Nb Great Plains Grassland & Shrubland	MG054 Great Plains Tallgrass Prairie & Shrubland		Faber-Langendoen, D. and P.F. Maycock. 1987. Composition and soil-environment analysis of prairies on Walpole Island. Canadian Journal of Botany 65: 2410 - 2419	1981, 1982	Prairies are regularly burned by First Nations band. No grazing.	

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2.C.1.Ne Southeastern North American Grassland & Shrubland	MG open phase of Longleaf Pine Woodland		Walker, J. and R.K. Peet. 1983. Composition and species diversity of pine-wiregrass savannas of the Green Swamp, North Carolina. Vegetatio 55: 163-179.	1982–1983	Green Swamp	
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2.C.1.Pa European Grassland & Heath	MG new. European Festuco-Brometea Dry Grassland		Ryser, P., R. Langenauer and A. Gigon. 1995. Folia Geobot. Phytotax, Praha 30:157-167	1991	Northern Switzerland, within Jura Mountains at 700 m elevation on nutrient poor, marly rendzina on a gamma-marl limestone.	Overall study was done using both 40 m^2 plot scale and 1 m^2 plot scale
2.C.1.Pa European Grassland & Heath	MG new. European Festuco-Brometea Dry Grassland		Ryser, P., R. Langenauer and A. Gigon. 1995. Folia Geobot. Phytotax, Praha 30:157-167	1991	Northern Switzerland, within Jura Mountains at 700 m elevation on nutrient poor, marly rendzina on a gamma-marl limestone.	MRG A - J1 - cut in July every yr
2.C.1.Pa European Grassland & Heath	MG new. European Festuco-Brometea Dry Grassland		Ryser, P., R. Langenauer and A. Gigon. 1995. Folia Geobot. Phytotax, Praha 30:157-167	1991	Northern Switzerland, within Jura Mountains at 700 m elevation on nutrient poor, marly rendzina on a gamma-marl limestone.	MRG A - J2 - cut in July every 2nd year

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2.C.1.Pa European Grassland & Heath	MG new. European Festuco-Brometea Dry Grassland		Ryser, P., R. Langenauer and A. Gigon. 1995. Folia Geobot. Phytotax, Praha 30:157-167	1991	Northern Switzerland, within Jura Mountains at 700 m elevation on nutrient poor, marly rendzina on a gamma-marl limestone.	MRG B -01- cut in October every year
2.C.1.Pa European Grassland & Heath	MG new. European Festuco-Brometea Dry Grassland		Ryser, P., R. Langenauer and A. Gigon. 1995. Folia Geobot. Phytotax, Praha 30:157-167	1991	Northern Switzerland, within Jura Mountains at 700 m elevation on nutrient poor, marly rendzina on a gamma-marl limestone.	MRG B - B1 - burned in Feb/March every year
2.C.1.Pa European Grassland & Heath	MG new. European Festuco-Brometea Dry Grassland		Ryser, P., R. Langenauer and A. Gigon. 1995. Folia Geobot. Phytotax, Praha 30:157-167	1991	Northern Switzerland, within Jura Mountains at 700 m elevation on nutrient poor, marly rendzina on a gamma-marl limestone.	MRG B - A - Abandoned
2.C.1.Pa European Grassland & Heath	MG new. European Festuco-Brometea Dry Grassland		Ryser, P., R. Langenauer and A. Gigon. 1995. Folia Geobot. Phytotax, Praha 30:157-167	1991	Northern Switzerland, within Jura Mountains at 700 m elevation on nutrient poor, marly rendzina on a gamma-marl limestone.	MRG A
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2.C.1.Pa European Grassland & Heath	MG new. European Festuco-Brometea Dry Grassland		Ryser, P., R. Langenauer and A. Gigon. 1995. Folia Geobot. Phytotax, Praha 30:157-167	1991	Northern Switzerland, within Jura Mountains at 700 m elevation on nutrient poor, marly rendzina on a gamma-marl limestone.	MRG A - J2 - cut in July every 2nd year
2.C.1.Pa European Grassland & Heath	MG new. European Festuco-Brometea Dry Grassland		Ryser, P., R. Langenauer and A. Gigon. 1995. Folia Geobot. Phytotax, Praha 30:157-167	1991	Northern Switzerland, within Jura Mountains at 700 m elevation on nutrient poor, marly rendzina on a gamma-marl limestone.	MRG A - J5 - cut in July every 5th yr
2.C.1.Pa European Grassland & Heath	MG new. European Festuco-Brometea Dry Grassland		Ryser, P., R. Langenauer and A. Gigon. 1995. Folia Geobot. Phytotax, Praha 30:157-167	1991	Northern Switzerland, within Jura Mountains at 700 m elevation on nutrient poor, marly rendzina on a gamma-marl limestone.	MRG B -01- cut in October every year

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2.C.1.Pa European Grassland & Heath	MG new. European Festuco-Brometea Dry Grassland		Ryser, P., R. Langenauer and A. Gigon. 1995. Folia Geobot. Phytotax, Praha 30:157-167	1991	Northern Switzerland, within Jura Mountains at 700 m elevation on nutrient poor, marly rendzina on a gamma-marl limestone.	MRG B - A - Abandoned
2.C.1.Pa European Grassland & Heath	MG new. European Festuco-Brometea Dry Grassland		Ryser, P., R. Langenauer and A. Gigon. 1995. Folia Geobot. Phytotax, Praha 30:157-167	1991	Northern Switzerland, within Jura Mountains at 700 m elevation on nutrient poor, marly rendzina on a gamma-marl limestone.	MRG A
2.C.1.Pa European Grassland & Heath	MG new. European Festuco-Brometea Dry Grassland		Ryser, P., R. Langenauer and A. Gigon. 1995. Folia Geobot. Phytotax, Praha 30:157-167	1991	Northern Switzerland, within Jura Mountains at 700 m elevation on nutrient poor, marly rendzina on a gamma-marl limestone.	MRG B
2.C.1.Pa European Grassland & Heath	MG new. European Festuco-Brometea Dry Grassland		Rodwell, J. 1992. British Plant Communities, Volume 3. Grasslands and Montane Communities. Cambridge University Press, Cambridge, UK.	1950s to 1970s		
2.C.1.Pa European Grassland & Heath	MG new. European Festuco-Brometea Dry Grassland		Rodwell, J. 1992. British Plant Communities, Volume 3. Grasslands and Montane Communities. Cambridge University Press, Cambridge, UK.	1950s to 1970s		
2.C.1.Pc Eastern Eurasian Grassland & Shrubland	?		Ting-Cheng, Zhu. 1992. Grasslands of China. Pp. 61 -82, in R.T. Coupland.Natural grasslands: Eastern Hemisphere and Résumé. Ecosystems of the World 8B. Elsevier, New York			
2.C.1.Pc Eastern Eurasian Grassland & Shrubland	?		Ting-Cheng, Zhu. 1992. Grasslands of China. Pp. 61 -82, in R.T. Coupland.Natural grasslands: Eastern Hemisphere and Résumé. Ecosystems of the World 8B. Elsevier, New York			

Division	Macrogroup	System	Citation	Year(s) of sampling (e.g., 1922–1923)	Land-Use History (if provided)	Treatment (if applicable)
2.C.2.Pa. Eurasian Boreal Grassland, Meadow & Shrubland	?		Kull, K. and M. Zobel. 1991. High species richness in an Estonian wooded meadow			
2.C.2.Pa. Eurasian Boreal Grassland, Meadow & Shrubland	?		Luoto, M, S Rekolainen, J Aakkula and J. Pykala. 2003. Loss of species richness and habitat connectivity in grasslands associated with agricultural change in Finland. Ambio 32:447-452.	1994	Almost all slopes in the river valleys, and often outside the vallueys, were grasslands since the late 1700s and throughout the 1800s. Today steeper slopes tend to remain in grassland. Patches were picked where known grazing histroy could be determined back to 1940.	
2.C.2.Pa. Eurasian Boreal Grassland, Meadow & Shrubland	?		Luoto, M, S Rekolainen, J Aakkula and J. Pykala. 2003. Loss of species richness and habitat connectivity in grasslands associated with agricultural change in Finland. Ambio 32:447-452.	1994	Almost all slopes in the river valleys, and often outside the vallueys, were grasslands since the late 1700s and throughout the 1800s. Today steeper slopes tend to remain in grassland. Patches were picked where known grazing histroy could be determined back to 1940.	
2.C.2.Pa. Eurasian Boreal Grassland, Meadow & Shrubland	?		Luoto, M, S Rekolainen, J Aakkula and J. Pykala. 2003. Loss of species richness and habitat connectivity in grasslands associated with agricultural change in Finland. Ambio 32:447-452.	1994	Almost all slopes in the river valleys, and often outside the vallueys, were grasslands since the late 1700s and throughout the 1800s. Today steeper slopes tend to remain in grassland. Patches were picked where known grazing histroy could be determined back to 1940.	
3.B.1.Na Western North American Cool Semi-Desert Scrub & Grassland	MG171 Great Basin & Intermountain Dry Shrubland & Grassland ?		Stohlgren, T.J., D.A. Guenther, P.H. Evangelista, and N. Alley. 2005. Patterns of plant species richness, rarity, endemism, and uniqueness in an arid landscape. Ecological Applications 15: 715-725.	1998–2002		

Division	Macrogroup	System	Citation	Year(s) of sampling (e.g., 1922–1923)	Land-Use History (if provided)	Treatment (if applicable)
3.B.1.Na Western North American Cool Semi-Desert Scrub & Grassland	?		Stohlgren, T.J., D.A. Guenther, P.H. Evangelista, and N. Alley. 2005. Patterns of plant species richness, rarity, endemism, and uniqueness in an arid landscape. Ecological Applications 15: 715-725.	1998–2002		
3.B.1.Na Western North American Cool Semi-Desert Scrub & Grassland	?		West, N, and Young, J.A. 2000. Pp. 255-284 In M. Barbour and W.D. Billings. North American Terrestrial Vegetation, 2nd ed.Cambridge University Press, New York.			
3.B.1.Pb Western Eurasian Cool Semi-Desert Scrub & Grassland	?		Ting-Cheng, Zhu. 1992. Grasslands of China. Pp. 61 -82, in R.T. Coupland.Natural grasslands: Eastern Hemisphere and Résumé. Ecosystems of the World 8B. Elsevier, New York			
3.B.1.Pb Western Eurasian Cool Semi-Desert Scrub & Grassland	?		Ting-Cheng, Zhu. 1992. Grasslands of China. Pp. 61 -82, in R.T. Coupland.Natural grasslands: Eastern Hemisphere and Résumé. Ecosystems of the World 8B. Elsevier, New York			
3.B.1.Ea Patagonian Grassland & Shrubland	Patagonian Grassland		Golluscio, R.A., R.J.C. Leon & S. Perelman. 1982. Caracterizacion fitosociologica de la estepa del oeste de Chubut; su relacion con el gradiente ambiental. Boletin de la Sociedad Argentina de Botanica 21: 299 - 324	early 1980s		
3.B.1.Ea Patagonian Grassland & Shrubland	Patagonian Grassland		Collantes, M., J. Anchorena & A. Cingolani. 1999. The steppes of Tierra del Fuego: floristic and growthform patterns controlled by soil fertility and moisture. Plant Ecology 140: 61–75.	early 1980s		
3.B.1.Ea Patagonian Grassland & Shrubland	Patagonian Grassland		Collantes, M., J. Anchorena & A. Cingolani. 1999. The steppes of Tierra del Fuego: floristic and growthform patterns controlled by soil fertility and moisture. Plant Ecology 140: 61–75.	early 1980s		

Division	Macrogroup	System	Citation	Year(s) of sampling (e.g., 1922–1923)	Land-Use History (if provided)	Treatment (if applicable)
3.B.1.Ea Patagonian Grassland & Shrubland	Patagonian Grassland		Golluscio, R.A., R.J.C. Leon & S. Perelman. 1982. Caracterizacion fitosociologica de la estepa del oeste de Chubut; su relacion con el gradiente ambiental. Boletin de la Sociedad Argentina de Botanica 21: 299 - 324	early 1980s		
4.B.1.Pa European Alpine Scrub, Forb Meadow & Grassland	European Juncetea trifidae Alpine Vegetation		Rodwell, J. 2000. British Plant Communities, Volume 5. Maritime Communities and Vegetation of Open Habitats. Cambridge University Press, Cambridge, UK.	1950s to 1970s		
4.B.1.Pa European Alpine Scrub, Forb Meadow & Grassland	European Juncetea trifidae Alpine Vegetation		Rodwell, J. 2000. British Plant Communities, Volume 5. Maritime Communities and Vegetation of Open Habitats. Cambridge University Press, Cambridge, UK.	1950s to 1970s		
4.B.1.Pa European Alpine Scrub, Forb Meadow & Grassland	European Juncetea trifidae Alpine Vegetation [probably]		Fischer, F and S. Wipf. 2002. Effect of low intensity grazing on the species-rich vegetation of traditionally mown subalpine meadows. Biological Conservation 104:1-11.	1998		
4.B.1.Pa European Alpine Scrub, Forb Meadow & Grassland	European Juncetea trifidae Alpine Vegetation [probably]		Fischer, F and S. Wipf. 2002. Effect of low intensity grazing on the species-rich vegetation of traditionally mown subalpine meadows. Biological Conservation 104:1-11.	1998		
4.B.1.Pa European Alpine Scrub, Forb Meadow & Grassland	European Juncetea trifidae Alpine Vegetation [probably]		Fischer, F and S. Wipf. 2002. Effect of low intensity grazing on the species-rich vegetation of traditionally mown subalpine meadows. Biological Conservation 104:1-11.	1998		
4.B.1.Pa European Alpine Scrub, Forb Meadow & Grassland	European Juncetea trifidae Alpine Vegetation [probably]		Fischer, F and S. Wipf. 2002. Effect of low intensity grazing on the species-rich vegetation of traditionally mown subalpine meadows. Biological Conservation 104:1-11.	1998		
4.B.1.Pb Central Asian Alpine Scrub, Forb Meadow & Grassland	?		Ting-Cheng, Zhu. 1992. Grasslands of China. Pp. 61 -82, in R.T. Coupland.Natural grasslands: Eastern Hemisphere and Résumé. Ecosystems of the World 8B. Elsevier, New York			

Division	Macrogroup	System	Citation	Year(s) of sampling (e.g., 1922–1923)	Land-Use History (if provided)	Treatment (if applicable)
4.B.1.Pb Central Asian Alpine Scrub, Forb Meadow & Grassland	?		Qiji Wang, L Jianquan and Zhao Xinquan. 2002. Patterns of Plant Species Diversity in the Northeastern Tibetan Plateau Pp 149-153. In Ch. Körner and E.M. Spehn. Mountain Biodiversity: A global assessment. The Parthenon Publishing Group. Washington DC			
4.B.1.Pb Central Asian Alpine Scrub, Forb Meadow & Grassland	?		Qiji Wang, L Jianquan and Zhao Xinquan. 2002. Patterns of Plant Species Diversity in the Northeastern Tibetan Plateau Pp 149-153. In Ch. Körner and E.M. Spehn. Mountain Biodiversity: A global assessment. The Parthenon Publishing Group. Washington DC			
4.B.1.Pb Central Asian Alpine Scrub, Forb Meadow & Grassland	?		Qiji Wang, L Jianquan and Zhao Xinquan. 2002. Patterns of Plant Species Diversity in the Northeastern Tibetan Plateau Pp 149-153. In Ch. Körner and E.M. Spehn. Mountain Biodiversity: A global assessment. The Parthenon Publishing Group. Washington DC			

Division	Size of Study Area	Study Design	Grassland Type	Unit area (m^2)	Spatial distribution of Units	# of units	Richness Comment	Richness/Unit Area	Standard Deviation	Standard Error
2.B.1.Fb South African Cape Mediterranean Scrub			Fynbos biome	10 m^2						
2.B.1.Fb South African Cape Mediterranean Scrub			Fynbos biome	100 m^2						
2.B.1.Fb South African Cape Mediterranean Scrub			Fynbos biome	1,000 m^2						
2.B.2.Na California Grassland & Meadow	360 km^2 region of Inner Coast Ranges of Lake and Napa Counties, northern California.	Sites were chosen where there was no history of mowing, grading and herbicide spraying, i.e. undisturbed roadside verges, and which bordered an area that was being grazed (paired design). Only sites grazed by cattle on a rotationa basis (spring and sumer on, winter off) were considered.	Ungrazed grassland	1 m^2		72		13.6	0.7	
2.B.2.Na California Grassland & Meadow			Grazed grassland	1 m^2		72		16.6	0.6	
2.B.2.Na California Grassland & Meadow			Serpentine grassland	1 m^2		72		15.4	0.7	

Division	Size of Study Area	Study Design	Grassland Type	Unit area (m^2)	Spatial distribution of Units	# of units	Richness Comment	Richness/Unit Area	Standard Deviation	Standard Error
2.B.2.Na California Grassland & Meadow			Non-serpentine grassland	1 m^2		72		14.6	0.7	
2.B.2.Na California Grassland & Meadow	Serpentine areas throughout the state		Serpentine grassland	1,000 m^2		109		49.8	15.6	
2.B.2.Na California Grassland & Meadow		Unknown	Valley grassland, California prairie	900 m^2			Authors simply state (pg 318) " Commonly 50 or more species are found in areas 30 x 30 m in area." Non-natives now contribute heavily to that richness.	50		
2.B.2.Px Mediterranean Basin Dry Grassland		Species Richness measured in 20 m x 1 m = (20 m^2) for herbs, and 20 x 10 m (200 m^2) for woody species. We use 200 m^2.	Brachypodium phoenicoides old field (15–50 yrs)	200 m^2		9		52	7.5	
2.C.1.Ea Pampas Grassland & Shrubland			Western (District of the) Pampa, late succesional	25 m^2		86		33.5		
2.C.1.Ea Pampas Grassland & Shrubland	Study Area covered 10,000 ha	37 plots were mowed in the past, and have a past history of cultivation and 38 plots in sites with no kinds of mowing or cultivation	Southern Pampa Deprimida	7,500 m^2	scattered	1		203		
2.C.1.Ea Pampas Grassland & Shrubland	Study Area covered 10,000 ha	37 plots were mowed in the past, and have a past history of cultivation and 38 plots in sites with no kinds of mowing or cultivation	Type 1	100 m^2		7		25		

Division	Size of Study Area	Study Design	Grassland Type	Unit area (m^2)	Spatial distribution of Units	# of units	Richness Comment	Richness/Unit Area	Standard Deviation	Standard Error
2.C.1.Ea Pampas Grassland & Shrubland	Study Area covered 10,000 ha	37 plots were mowed in the past, and have a past history of cultivation and 38 plots in sites with no kinds of mowing or cultivation	Type 2 - subA	100 m^2		8		52		
2.C.1.Ea Pampas Grassland & Shrubland	Study Area covered 10,000 ha	37 plots were mowed in the past, and have a past history of cultivation and 38 plots in sites with no kinds of mowing or cultivation	Type 2 - subB	100 m^2		5		48		
2.C.1.Ea Pampas Grassland & Shrubland	Study Area covered 10,000 ha	37 plots were mowed in the past, and have a past history of cultivation and 38 plots in sites with no kinds of mowing or cultivation	Type 3 - subA	100 m^2		10		43		
2.C.1.Ea Pampas Grassland & Shrubland	Study Area covered 10,000 ha	37 plots were mowed in the past, and have a past history of cultivation and 38 plots in sites with no kinds of mowing or cultivation	Type 3 - subB	100 m^2		5		38		
2.C.1.Ea Pampas Grassland & Shrubland	Study Area covered 10,000 ha	37 plots were mowed in the past, and have a past history of cultivation and 38 plots in sites with no kinds of mowing or cultivation	Type 4	100 m^2		7		27		
2.C.1.Ea Pampas Grassland & Shrubland	Study Area covered 10,000 ha	37 plots were mowed in the past, and have a past history of cultivation and 38 plots in sites with no kinds of mowing or cultivation	Type 5 - subA	100 m^2		5		28		

Division	Size of Study Area	Study Design	Grassland Type	Unit area (m^2)	Spatial distribution of Units	# of units	Richness Comment	Richness/Unit Area	Standard Deviation	Standard Error
2.C.1.Ea Pampas Grassland & Shrubland	Study Area covered 10,000 ha	37 plots were mowed in the past, and have a past history of cultivation and 38 plots in sites with no kinds of mowing or cultivation	Type 5 - subB	100 m^2		5		24		
2.C.1.Ea Pampas Grassland & Shrubland	Study Area covered 10,000 ha	37 plots were mowed in the past, and have a past history of cultivation and 38 plots in sites with no kinds of mowing or cultivation	Type 5 - subC	100 m^2		6		17		
2.C.1.Ea Pampas Grassland & Shrubland			Western (District of the) Pampa, natural	300 m^2		1		47		
2.C.1.Ea Pampas Grassland & Shrubland			Western (District of the) Pampa, semi-natural	275 m^2		1		32		
2.C.1.Ea Pampas Grassland & Shrubland			Western (District of the) Pampa, early succesional	200 m^2		1		22		
2.C.1.Ea Pampas Grassland & Shrubland			Western (District of the) Pampa, late succesional	125 m^2		1		18		
2.C.1.Eb Southern Andean Shrubland and Grassland	> 2,000 m elev above timberline	stratified combining succesive 100 m altitude belts with different slope and aspect	Alpine temperate high Andes	100 m^2	scattered	166		15		
2.C.1.Fc Southern African Montane Grassland			KwaZulu-Natal grassland	100 m^2						

Division	Size of Study Area	Study Design	Grassland Type	Unit area (m^2)	Spatial distribution of Units	# of units	Richness Comment	Richness/Unit Area	Standard Deviation	Standard Error
2.C.1.Fc Southern African Montane Grassland			South African temperate grasslands	1,000 m^2						
2.C.1.La Australian Grassland & Shrubland	Southeast Queensland bioregion	Survey was conducted on 3 large properties, totaling 2,756 ha.	**Subtropical grassland**	30 m^2		212		41		1
2.C.1.La Australian Grassland & Shrubland	Southeast Queensland bioregion	Survey was conducted on 3 large properties, totaling 2,756 ha.	S1 - Sown pasture	30 m^2		16		26		1.3
2.C.1.La Australian Grassland & Shrubland	Southeast Queensland bioregion	Survey was conducted on 3 large properties, totaling 2,756 ha.	S2 - crop	30 m^2		14		26		3.7
2.C.1.La Australian Grassland & Shrubland	Southeast Queensland bioregion	Survey was conducted on 3 large properties, totaling 2,756 ha.	S3 - Roadside (disturbed)	30 m^2		18		32		2.8
2.C.1.La Australian Grassland & Shrubland	Southeast Queensland bioregion	Survey was conducted on 3 large properties, totaling 2,756 ha.	S4 - Native pasture	30 m^2		109		45		1

Species Richness_Temperate

Division	Size of Study Area	Study Design	Grassland Type	Unit area (m^2)	Spatial distribution of Units	# of units	Richness Comment	Richness/Unit Area	Standard Deviation	Standard Error
2.C.1.La Australian Grassland & Shrubland	Southeast Queensland bioregion	Survey was conducted on 3 large properties, totaling 2,756 ha.	S5 - Roadsides (undisturbed)	30 m^2		35		44		2
2.C.1.La Australian Grassland & Shrubland			**Temperate grassland**	30 m^2		120		28		0.7
2.C.1.La Australian Grassland & Shrubland			T1 - Roadsides (disturbed)	30 m^2		20		22		2.1
2.C.1.La Australian Grassland & Shrubland			T2 - 'Natural' pasture	30 m^2		19		21		1.3
2.C.1.La Australian Grassland & Shrubland			T3 - Stock route	30 m^2		39		29		1.2

Species Richness_Temperate

Division	Size of Study Area	Study Design	Grassland Type	Unit area (m^2)	Spatial distribution of Units	# of units	Richness Comment	Richness/Unit Area	Standard Deviation	Standard Error
2.C.1.La Australian Grassland & Shrubland			T4 - Native Pasture (grazed reserve)	30 m^2		21		31		1.8
2.C.1.La Australian Grassland & Shrubland			T5 - Reserve (no domestic livestock)	30 m^2		21		30		2
2.C.1.Lb New Zealand Grassland & Shrubland		See Table 9.4 Communities 2 - 12 had Mean no. of vascular species reported by types. We averaged these 11 communities together.	Chionochloa communities	100 m^2		49		36	8.8	
2.C.1.Lb New Zealand Grassland & Shrubland		See Table 9.5 Communities 3–11, 13–14 had Mean no. of vascular species reported by types. We averaged these 11 communities together.	Short-tussock grasslands	100 m^2		73		36.8	9.4	
2.C.1.Lb New Zealand Grassland & Shrubland		See Table 9.9 Communities 1–3 had Mean no. of vascular species reported by types. We averaged these 3 communities together.	Rytidosperma clavatum grassland (maritime)	100 m^2		10		30.3	1.5	

Division	Size of Study Area	Study Design	Grassland Type	Unit area (m^2)	Spatial distribution of Units	# of units	Richness Comment	Richness/Unit Area	Standard Deviation	Standard Error
2.C.1.Na Vancouverian & Rocky Mountain Grassland & Shrubland		Comparison of exclosures to grazed sites.	Ungrazed exclosures	1 m^2		260		8		0.3
2.C.1.Na Vancouverian & Rocky Mountain Grassland & Shrubland		Comparison of exclosures to grazed sites.	Grazed-adjacent plots	1 m^2		260		9.4		0.3
2.C.1.Na Vancouverian & Rocky Mountain Grassland & Shrubland		Comparison of exclosures to grazed sites.	Grazed-distance plots	1 m^2		260		9.4		0.3
2.C.1.Na Vancouverian & Rocky Mountain Grassland & Shrubland		Comparison of exclosures to grazed sites.	Ungrazed exclosures	1,000 m^2		26		34.6		2.5
2.C.1.Na Vancouverian & Rocky Mountain Grassland & Shrubland		Comparison of exclosures to grazed sites.	Grazed-adjacent plots	1,000 m^2		26		35.6		2.8
2.C.1.Na Vancouverian & Rocky Mountain Grassland & Shrubland		Comparison of exclosures to grazed sites.	Grazed-distance plots	1,000 m^2		26		34.8		2.9
2.C.1.Nb Great Plains Grassland & Shrubland			all types	1,000 m^2		16		42.9		2.4

Division	Size of Study Area	Study Design	Grassland Type	Unit area (m^2)	Spatial distribution of Units	# of units	Richness Comment	Richness/Unit Area	Standard Deviation	Standard Error
2.C.1.Nb Great Plains Grassland & Shrubland			tallgrass prairie	1,000 m^2		4		48.5		3.4
2.C.1.Nb Great Plains Grassland & Shrubland			northern mixed prairie	1,000 m^2		4		46.5		6.5
2.C.1.Nb Great Plains Grassland & Shrubland			mixed grass prairie	1,000 m^2		4		42.8		3.1
2.C.1.Nb Great Plains Grassland & Shrubland			shortgrass steppe	1,000 m^2		4		33.8		3.7
2.C.1.Nb Great Plains Grassland & Shrubland			tallgrass prairie	4,000 m^2	scattered	1	Richness may be an over-estimate because the 4000 m2 area is not contiguous	77		3.4
2.C.1.Nb Great Plains Grassland & Shrubland			northern mixed prairie	4,000 m^2	scattered	1	Richness may be an over-estimate because the 4000 m2 area is not contiguous	73		6.5
2.C.1.Nb Great Plains Grassland & Shrubland			mixed grass prairie	4,000 m^2	scattered	1	Richness may be an over-estimate because the 4000 m2 area is not contiguous	64		3.1
2.C.1.Nb Great Plains Grassland & Shrubland			shortgrass steppe	4,000 m^2	scattered	1	Richness may be an over-estimate because the 4000 m2 area is not contiguous	39		3.7
2.C.1.Nb Great Plains Grassland & Shrubland		15 1 m^2 quadrats were randomly distributed within a stand.	dry-mesic sandy prairie	~ 1,000 m^2	scattered	2	Richness may be an over-estimate because the 15 m2 area is not contiguous	43		
2.C.1.Nb Great Plains Grassland & Shrubland		15 1 m^2 quadrats were randomly distributed within a stand.	mesic sandy-loam prairie	~ 1,000 m^2	scattered	3	Richness may be an over-estimate because the 15 m2 area is not contiguous	51		

Division	Size of Study Area	Study Design	Grassland Type	Unit area (m^2)	Spatial distribution of Units	# of units	Richness Comment	Richness/Unit Area	Standard Deviation	Standard Error
2.C.1.Nb Great Plains Grassland & Shrubland		15 1 m^2 quadrats were randomly distributed within a stand.	wet-mesic sandy loam prairie	~ 1,000 m^2	scattered	11	Richness may be an over-estimate because the 15 m2 area is not contiguous	50		
2.C.1.Nb Great Plains Grassland & Shrubland		15 1 m^2 quadrats were randomly distributed within a stand.	wet loam prairie	~ 1,000 m^2	scattered	4	Richness may be an over-estimate because the 15 m2 area is not contiguous	33		
2.C.1.Nb Great Plains Grassland & Shrubland		A complete vascular plant species list was compiled per stand, after doing 15 1 m^2 quadrats.	dry-mesic sandy prairie	3,000 m^2		2		63		
2.C.1.Nb Great Plains Grassland & Shrubland		A complete vascular plant species list was compiled per stand, after doing 15 1 m^2 quadrats.	mesic sandy-loam prairie	5,000 m^2		3		67		
2.C.1.Nb Great Plains Grassland & Shrubland		A complete vascular plant species list was compiled per stand, after doing 15 1 m^2 quadrats.	wet-mesic sandy loam prairie	14,000 m^2		11		74		
2.C.1.Nb Great Plains Grassland & Shrubland		A complete vascular plant species list was compiled per stand, after doing 15 1 m^2 quadrats.	wet loam prairie	19,000 m^2		4		54		
2.C.1.Ne Southeastern North American Grassland & Shrubland	Fire burning on a 1–4 yr cycle, some grazing and logging.	Savannas divided into dry, mesic and wet savannas, with high (annual) or low (infrequent) fire frequency	dry savanna - high fire	0.25		2		19.5	0.5	
2.C.1.Ne Southeastern North American Grassland & Shrubland	Fire burning on a 1–4 yr cycle, some grazing and logging.		dry savanna - low fire	0.25		2		20.8	1.7	

Division	Size of Study Area	Study Design	Grassland Type	Unit area (m^2)	Spatial distribution of Units	# of units	Richness Comment	Richness/Unit Area	Standard Deviation	Standard Error
2.C.1.Ne Southeastern North American Grassland & Shrubland	Fire burning on a 1–4 yr cycle, some grazing and logging.		mesic savanna - high fire	0.25		8		22.2	3.6	
2.C.1.Ne Southeastern North American Grassland & Shrubland	Fire burning on a 1–4 yr cycle, some grazing and logging.		mesic savanna - low fire	0.25		3		14	3.2	
2.C.1.Ne Southeastern North American Grassland & Shrubland	Fire burning on a 1–4 yr cycle, some grazing and logging.		wet savanna - high fire	0.25		3		13.2	4.9	
2.C.1.Ne Southeastern North American Grassland & Shrubland	Fire burning on a 1–4 yr cycle, some grazing and logging.		wet savanna - low fire	0.25		3		11	5.8	
2.C.1.Ne Southeastern North American Grassland & Shrubland	Fire burning on a 1–4 yr cycle, some grazing and logging.		dry savanna - high fire	1		2		32.2	2.3	
2.C.1.Ne Southeastern North American Grassland & Shrubland	Fire burning on a 1–4 yr cycle, some grazing and logging.		dry savanna - low fire	1		2		33.6	2.4	
2.C.1.Ne Southeastern North American Grassland & Shrubland	Fire burning on a 1–4 yr cycle, some grazing and logging.		mesic savanna - high fire	1		8		35.2	4.8	
2.C.1.Ne Southeastern North American Grassland & Shrubland	Fire burning on a 1–4 yr cycle, some grazing and logging.		mesic savanna - low fire	1		3		25.9	7.3	

Division	Size of Study Area	Study Design	Grassland Type	Unit area (m^2)	Spatial distribution of Units	# of units	Richness Comment	Richness/Unit Area	Standard Deviation	Standard Error
2.C.1.Ne Southeastern North American Grassland & Shrubland	Fire burning on a 1–4 yr cycle, some grazing and logging.		wet savanna - high fire	1		3		24.3	8.8	
2.C.1.Ne Southeastern North American Grassland & Shrubland	Fire burning on a 1–4 yr cycle, some grazing and logging.		wet savanna - low fire	1		3		22.4	9.1	
2.C.1.Ne Southeastern North American Grassland & Shrubland	Fire burning on a 1–4 yr cycle, some grazing and logging.		dry savanna - high fire	2.5		2		43.5	4.9	
2.C.1.Ne Southeastern North American Grassland & Shrubland	Fire burning on a 1–4 yr cycle, some grazing and logging.		dry savanna - low fire	2.5		2		44.5	2.1	
2.C.1.Ne Southeastern North American Grassland & Shrubland	Fire burning on a 1–4 yr cycle, some grazing and logging.		mesic savanna - high fire	2.5		8		46.6	6.3	
2.C.1.Ne Southeastern North American Grassland & Shrubland	Fire burning on a 1–4 yr cycle, some grazing and logging.		mesic savanna - low fire	2.5		3		34.7	3.2	
2.C.1.Ne Southeastern North American Grassland & Shrubland	Fire burning on a 1–4 yr cycle, some grazing and logging.		wet savanna - high fire	2.5		3		33.7	12.7	
2.C.1.Ne Southeastern North American Grassland & Shrubland	Fire burning on a 1–4 yr cycle, some grazing and logging.		wet savanna - low fire	2.5		3		31.7	12.9	

Division	Size of Study Area	Study Design	Grassland Type	Unit area (m^2)	Spatial distribution of Units	# of units	Richness Comment	Richness/Unit Area	Standard Deviation	Standard Error
2.C.1.Ne Southeastern North American Grassland & Shrubland	Fire burning on a 1–4 yr cycle, some grazing and logging.		dry savanna - high fire	25		2		53.5	2.1	
2.C.1.Ne Southeastern North American Grassland & Shrubland	Fire burning on a 1–4 yr cycle, some grazing and logging.		dry savanna - low fire	25		2		54	5.7	
2.C.1.Ne Southeastern North American Grassland & Shrubland	Fire burning on a 1–4 yr cycle, some grazing and logging.		mesic savanna - high fire	25		8		57.3	8.6	
2.C.1.Ne Southeastern North American Grassland & Shrubland	Fire burning on a 1–4 yr cycle, some grazing and logging.		mesic savanna - low fire	25		3		50.3	1.1	
2.C.1.Ne Southeastern North American Grassland & Shrubland	Fire burning on a 1–4 yr cycle, some grazing and logging.		wet savanna - high fire	25		3		43	14.4	
2.C.1.Ne Southeastern North American Grassland & Shrubland	Fire burning on a 1–4 yr cycle, some grazing and logging.		wet savanna - low fire	25		3		43.3	11.1	
2.C.1.Ne Southeastern North American Grassland & Shrubland	Fire burning on a 1–4 yr cycle, some grazing and logging.		dry savanna - high fire	625		2		73.5	3.5	
2.C.1.Ne Southeastern North American Grassland & Shrubland	Fire burning on a 1–4 yr cycle, some grazing and logging.		dry savanna - low fire	625		2		68	5.7	

Division	Size of Study Area	Study Design	Grassland Type	Unit area (m^2)	Spatial distribution of Units	# of units	Richness Comment	Richness/Unit Area	Standard Deviation	Standard Error
2.C.1.Ne Southeastern North American Grassland & Shrubland	Fire burning on a 1–4 yr cycle, some grazing and logging.		mesic savanna - high fire	625		8		79.3	5.3	
2.C.1.Ne Southeastern North American Grassland & Shrubland	Fire burning on a 1–4 yr cycle, some grazing and logging.		mesic savanna - low fire	625		3		71.2	5.3	
2.C.1.Ne Southeastern North American Grassland & Shrubland	Fire burning on a 1–4 yr cycle, some grazing and logging.		wet savanna - high fire	625		3		58	13	
2.C.1.Ne Southeastern North American Grassland & Shrubland	Fire burning on a 1–4 yr cycle, some grazing and logging.		wet savanna - low fire	625		3		54.3	8.1	
2.C.1.Pa European Grassland & Heath		Permanent plots (3 replicates of 50 m^2 each, with 40 m^2 larger frame and with 1 m^2 plot in rest of area) with six different management regimes were established in 1978. Sites were sampled in 1991 and 1993, but differences between years was not significant. Here we report the 1991 values	Mesobrometum erecti type, Medicago falva subassociation	40 m^2		18				
2.C.1.Pa European Grassland & Heath				40 m^2		3		52.3	3.1	
2.C.1.Pa European Grassland & Heath				40 m^2		3		55.7	0.6	

Species Richness_Temperate

Division	Size of Study Area	Study Design	Grassland Type	Unit area (m^2)	Spatial distribution of Units	# of units	Richness Comment	Richness/Unit Area	Standard Deviation	Standard Error
2.C.1.Pa European Grassland & Heath				40 m^2		3		52.3	2.1	
2.C.1.Pa European Grassland & Heath				40 m^2		3		45.3	6	
2.C.1.Pa European Grassland & Heath				40 m^2		3		45.3	1.2	
2.C.1.Pa European Grassland & Heath				40 m^2		3		46	1	
2.C.1.Pa European Grassland & Heath				40 m^2		9		53		
2.C.1.Pa European Grassland & Heath				40 m^2		9		45		
2.C.1.Pa European Grassland & Heath				1 m^2		3		36	2	
2.C.1.Pa European Grassland & Heath				1 m^2		3		39.3	4	
2.C.1.Pa European Grassland & Heath				1 m^2		3		37.7	1.2	
2.C.1.Pa European Grassland & Heath				1 m^2		3		27.7	7.6	

Division	Size of Study Area	Study Design	Grassland Type	Unit area (m^2)	Spatial distribution of Units	# of units	Richness Comment	Richness/Unit Area	Standard Deviation	Standard Error
2.C.1.Pa European Grassland & Heath				1 m^2		3		23.7	4.5	
2.C.1.Pa European Grassland & Heath				1 m^2		3		21.3	3.2	
2.C.1.Pa European Grassland & Heath				1 m^2		9		37		
2.C.1.Pa European Grassland & Heath				1 m^2		9		24		
2.C.1.Pa European Grassland & Heath	Britain	Plot sizes varied from 2 x 2 to 4 x 4, depending on the coarseness (tussock nature) of the grasses.	CG4 Brachypodium pinnatum grassland	~10 m^2		231		17		
2.C.1.Pa European Grassland & Heath	Britain	Plot sizes varied from 2 x 2 to 4 x 4, depending on the coarseness (tussock nature) of the grasses.	CG1 Festuca ovina - Carlina vulgaris grassland	~10 m^2		119		27		
2.C.1.Pc Eastern Eurasian Grassland & Shrubland		Not specified	Meadow steppe	1 m^2			Richness per unit area is the midpoint of the range that is provided in Table 3.1	20		
2.C.1.Pc Eastern Eurasian Grassland & Shrubland		Not specified	Typical steppe	1 m^2			Richness per unit area is the midpoint of the range that is provided in Table 3.1	16		

Division	Size of Study Area	Study Design	Grassland Type	Unit area (m^2)	Spatial distribution of Units	# of units	Richness Comment	Richness/Unit Area	Standard Deviation	Standard Error
2.C.2.Pa. Eurasian Boreal Grassland, Meadow & Shrubland	Estonian meadow of 20 ha	Seven sites were sampled using 10 10 cm and 20 cm x 20 cm microplots, and a larger 1 m^2 plot used to estimate cover. Species richness reported at the microplot level, except for 1 plot (see Table 2).	Sesleria coerulea - Filipendula hexapetala association (calcicolous grassland)	1 m^2		1		63		
2.C.2.Pa. Eurasian Boreal Grassland, Meadow & Shrubland	Approx 100 km^2, in southwest Finland		agricultural grassland - continuous grazing (within last 5 yrs)	12,500 m^2		49		68.7	22.8	
2.C.2.Pa. Eurasian Boreal Grassland, Meadow & Shrubland	Approx 100 km^2, in southwest Finland		agricultural grassland - recently not grazed (5–25 yrs)	12,500 m^2		199		59.1	18.1	
2.C.2.Pa. Eurasian Boreal Grassland, Meadow & Shrubland	Approx 100 km^2, in southwest Finland			12,500 m^2		41		56.2	24.5	
3.B.1.Na Western North American Cool Semi-Desert Scrub & Grassland	Grand Staircase - Escalante National Monument		Desert shrub / grassland	1,000 m^2		16		28.4		1.8

Division	Size of Study Area	Study Design	Grassland Type	Unit area (m^2)	Spatial distribution of Units	# of units	Richness Comment	Richness/Unit Area	Standard Deviation	Standard Error
3.B.1.Na Western North American Cool Semi-Desert Scrub & Grassland			Sagebrush	1,000 m^2		31		22.3		1.7
3.B.1.Na Western North American Cool Semi-Desert Scrub & Grassland		West and Young cite a paper by Daubenmire (1975) Northwest Science 49:120–140	Sagebrush Steppe	1,000 m^2			Authors simply state that "Daubenmire (1975) found an average of 20 vascular species on several plots of size 1000 m2.	20		
3.B.1.Pb Western Eurasian Cool Semi-Desert Scrub & Grassland		Not specified	Desert steppe	1 m^2			Richness per unit area is the midpoint of the range that is provided in Table 3.1	10		
3.B.1.Pb Western Eurasian Cool Semi-Desert Scrub & Grassland		Not specified	Shrub steppe	1 m^2			Richness per unit area is the midpoint of the range that is provided in Table 3.1	8		
3.B.1.Ea Patagonian Grassland & Shrubland			Patagonian sub-Andean grass steppes (Festuca pallescens, Rhytidosperma picta, Lathyrus magellanicus community)	500 m^2				34		
3.B.1.Ea Patagonian Grassland & Shrubland			mesic Magellanic grasslands (Festuca-Empetrum grassland)	100 m^2				33		
3.B.1.Ea Patagonian Grassland & Shrubland			xeric Magellanic grass steppes (Festuca-Poa grassland with Carex andina and Hordeum-Carex andina short grassland)	100 m^2				28		

Division	Size of Study Area	Study Design	Grassland Type	Unit area (m^2)	Spatial distribution of Units	# of units	Richness Comment	Richness/Unit Area	Standard Deviation	Standard Error
3.B.1.Ea Patagonian Grassland & Shrubland			Patagonian grass-shrub steppes (Stipa speciosa, S. humilis, A. campestris, Berberis heterophylla and Poa lanuginosa community)	500 m^2				26		
4.B.1.Pa European Alpine Scrub, Forb Meadow & Grassland	Britain	Plot sizes varied from 2 x 2 to 4 x 4, depending on the coarseness (tussock nature) of the grasses.	U7 Nardus stricta-Carex bigelowii grass-heath	~10 m^2		96		19		
4.B.1.Pa European Alpine Scrub, Forb Meadow & Grassland	Britain	Plot sizes varied from 2 x 2 to 4 x 4, depending on the coarseness (tussock nature) of the grasses.	U13 Deschampsia cespitosa-Galium saxile grassland	~10 m^2		47		24		
4.B.1.Pa European Alpine Scrub, Forb Meadow & Grassland			mown parcels	16 m^2		10		50.5	3.1	
4.B.1.Pa European Alpine Scrub, Forb Meadow & Grassland			grazed parcels	16 m^2		11		52.5	2.9	
4.B.1.Pa European Alpine Scrub, Forb Meadow & Grassland			mown parcels	32 m^2		10		68.8	3.6	
4.B.1.Pa European Alpine Scrub, Forb Meadow & Grassland			grazed parcels	32 m^2		11		67.8	3.4	
4.B.1.Pb Central Asian Alpine Scrub, Forb Meadow & Grassland		Not specified	Alpine steppe	1 m^2			Richness per unit area is the midpoint of the range that is provided in Table 3.1	9		

Division	Size of Study Area	Study Design	Grassland Type	Unit area (m^2)	Spatial distribution of Units	# of units	Richness Comment	Richness/Unit Area	Standard Deviation	Standard Error
4.B.1.Pb Central Asian Alpine Scrub, Forb Meadow & Grassland		Plot sizes were based on a 5 x 5 m for the shrub-meadow ecotone.	Shrub-meadow	25 m^2		11		28.3		2.8
4.B.1.Pb Central Asian Alpine Scrub, Forb Meadow & Grassland		Plot sizes were based on a 1 x 1 m for the meadow-steppe ecotone.	meadow-steppe	1 m^2		22		18.3		1.1
4.B.1.Pb Central Asian Alpine Scrub, Forb Meadow & Grassland		Plot sizes were based on a 1 x 1 m for the steppe - desert ecotone.	steppe-desert	1 m^2		19		11		0.9

Division	Reported range of richness	Sampled Growth Form	Other Comments	Native Richness/Unit Area	Exotic Richness/ Unit Area
2.B.1.Fb South African Cape Mediterranean Scrub	10 to 20	all vascular species			
2.B.1.Fb South African Cape Mediterranean Scrub	30 to 40	all vascular species			
2.B.1.Fb South African Cape Mediterranean Scrub	40 to 120	all vascular species			
2.B.2.Na California Grassland & Meadow		All vascular species	Proportions of natives did not differe between grazed and ungrazed		
2.B.2.Na California Grassland & Meadow		All vascular species			
2.B.2.Na California Grassland & Meadow		All vascular species	Total richness across all 72 sites was reported as 160	106	54

Division	Reported range of richness	Sampled Growth Form	Other Comments	Native Richness/Unit Area	Exotic Richness/ Unit Area
2.B.2.Na California Grassland & Meadow		All vascular species	Total richness across all 72 sites was reported as 109	58	51
2.B.2.Na California Grassland & Meadow		All vascular species	S.D. is reported at 15.6, but this applies to the native species. Exotics S.D = 8.0	42.6	7
2.B.2.Na California Grassland & Meadow		All vascular species			
2.B.2.Px Mediterranean Basin Dry Grassland	42 to 61	All vascular species	Species Richness values taken from Fig.1. Nine values between 11 and 50 years were used.		
2.C.1.Ea Pampas Grassland & Shrubland	18 to 47	herbs			
2.C.1.Ea Pampas Grassland & Shrubland		herbs			
2.C.1.Ea Pampas Grassland & Shrubland		herbs			

Species Richness_Temperate

Division	Reported range of richness	Sampled Growth Form	Other Comments	Native Richness/Unit Area	Exotic Richness/ Unit Area
2.C.1.Ea Pampas Grassland & Shrubland		herbs			
2.C.1.Ea Pampas Grassland & Shrubland		herbs			
2.C.1.Ea Pampas Grassland & Shrubland		herbs			
2.C.1.Ea Pampas Grassland & Shrubland		herbs			
2.C.1.Ea Pampas Grassland & Shrubland		herbs			
2.C.1.Ea Pampas Grassland & Shrubland		herbs			

Division	Reported range of richness	Sampled Growth Form	Other Comments	Native Richness/Unit Area	Exotic Richness/ Unit Area
2.C.1.Ea Pampas Grassland & Shrubland		herbs			
2.C.1.Ea Pampas Grassland & Shrubland		herbs			
2.C.1.Ea Pampas Grassland & Shrubland		herbs			
2.C.1.Ea Pampas Grassland & Shrubland		herbs			
2.C.1.Ea Pampas Grassland & Shrubland		herbs			
2.C.1.Ea Pampas Grassland & Shrubland		herbs			
2.C.1.Eb Southern Andean Shrubland and Grassland	9 to 21	all vascular species			
2.C.1.Fc Southern African Montane Grassland	9 to 39	herbs			

Division	Reported range of richness	Sampled Growth Form	Other Comments	Native Richness/Unit Area	Exotic Richness/ Unit Area
2.C.1.Fc Southern African Montane Grassland	55 - 100	all vascular species			
2.C.1.La Australian Grassland & Shrubland	Range is 3 to 83.	All vascular species	Further classification review is needed to determine if these subtropical and temperate grasslands belong with the "tussock grassland" type or whether they have no natural analogue (i.e. "rudera" grasslands) that are derived from clearing Eucalypt woodlands.	31	10
2.C.1.La Australian Grassland & Shrubland		All vascular species		14	12
2.C.1.La Australian Grassland & Shrubland		All vascular species		15	11
2.C.1.La Australian Grassland & Shrubland		All vascular species		20	12
2.C.1.La Australian Grassland & Shrubland		All vascular species		36	9

Species Richness_Temperate

Division	Reported range of richness	Sampled Growth Form	Other Comments	Native Richness/Unit Area	Exotic Richness/ Unit Area
2.C.1.La Australian Grassland & Shrubland		All vascular species		37	7
2.C.1.La Australian Grassland & Shrubland		All vascular species		19	9
2.C.1.La Australian Grassland & Shrubland		All vascular species		12	10
2.C.1.La Australian Grassland & Shrubland		All vascular species		12	9
2.C.1.La Australian Grassland & Shrubland		All vascular species		22	7

Species Richness_Temperate

Division	Reported range of richness	Sampled Growth Form	Other Comments	Native Richness/Unit Area	Exotic Richness/ Unit Area
2.C.1.La Australian Grassland & Shrubland		All vascular species		23	8
2.C.1.La Australian Grassland & Shrubland		All vascular species		24	6
2.C.1.Lb New Zealand Grassland & Shrubland	Range is 21 to 47	All vascular species	Note that the range is based on range across the 11 community types, not at the plot level.		
2.C.1.Lb New Zealand Grassland & Shrubland	Range is 23 to 50	All vascular species	Note that the range is based on range across the 11 community types, not at the plot level.		
2.C.1.Lb New Zealand Grassland & Shrubland	Range is 29 to 32	All vascular species	Note that the range is based on range across the 3 community types, not at the plot level.		

Species Richness_Temperate

Division	Reported range of richness	Sampled Growth Form	Other Comments	Native Richness/Unit Area	Exotic Richness/ Unit Area
2.C.1.Na Vancouverian & Rocky Mountain Grassland & Shrubland		All vascular species	Standard error for avg richness is taken from the native species standard error.	7.1	0.9
2.C.1.Na Vancouverian & Rocky Mountain Grassland & Shrubland		All vascular species	Standard error for avg richness is taken from the native species standard error.	8.3	1.1
2.C.1.Na Vancouverian & Rocky Mountain Grassland & Shrubland		All vascular species	Standard error for avg richness is taken from the native species standard error.	8.5	0.9
2.C.1.Na Vancouverian & Rocky Mountain Grassland & Shrubland		All vascular species	Standard error for avg richness is taken from the native species standard error.	31.5	3.1
2.C.1.Na Vancouverian & Rocky Mountain Grassland & Shrubland		All vascular species	Standard error for avg richness is taken from the native species standard error.	32.6	3
2.C.1.Na Vancouverian & Rocky Mountain Grassland & Shrubland		All vascular species	Standard error for avg richness is taken from the native species standard error.	31.6	3.2
2.C.1.Nb Great Plains Grassland & Shrubland		All vascular species	Of the average of 43 species present, 18 had less than 1% cover.	33.5	5.5

Species Richness_Temperate

Division	Reported range of richness	Sampled Growth Form	Other Comments	Native Richness/Unit Area	Exotic Richness/ Unit Area
2.C.1.Nb Great Plains Grassland & Shrubland		All vascular species			
2.C.1.Nb Great Plains Grassland & Shrubland		All vascular species			
2.C.1.Nb Great Plains Grassland & Shrubland		All vascular species			
2.C.1.Nb Great Plains Grassland & Shrubland		All vascular species	Total richness = richness across all 4 plots combined.		
2.C.1.Nb Great Plains Grassland & Shrubland		All vascular species			
2.C.1.Nb Great Plains Grassland & Shrubland		All vascular species			
2.C.1.Nb Great Plains Grassland & Shrubland		All vascular species			
2.C.1.Nb Great Plains Grassland & Shrubland		All vascular species	Total richness = richness across all 4 plots combined.		
2.C.1.Nb Great Plains Grassland & Shrubland		All vascular species			
2.C.1.Nb Great Plains Grassland & Shrubland		All vascular species			

Division	Reported range of richness	Sampled Growth Form	Other Comments	Native Richness/Unit Area	Exotic Richness/ Unit Area
2.C.1.Nb Great Plains Grassland & Shrubland		All vascular species			
2.C.1.Nb Great Plains Grassland & Shrubland		All vascular species			
2.C.1.Nb Great Plains Grassland & Shrubland		All vascular species			
2.C.1.Nb Great Plains Grassland & Shrubland		All vascular species			
2.C.1.Nb Great Plains Grassland & Shrubland		All vascular species			
2.C.1.Nb Great Plains Grassland & Shrubland		All vascular species			
2.C.1.Ne Southeastern North American Grassland & Shrubland		All vascular species			
2.C.1.Ne Southeastern North American Grassland & Shrubland		All vascular species			

Division	Reported range of richness	Sampled Growth Form	Other Comments	Native Richness/Unit Area	Exotic Richness/ Unit Area
2.C.1.Ne Southeastern North American Grassland & Shrubland		All vascular species			
2.C.1.Ne Southeastern North American Grassland & Shrubland		All vascular species			
2.C.1.Ne Southeastern North American Grassland & Shrubland		All vascular species			
2.C.1.Ne Southeastern North American Grassland & Shrubland		All vascular species			
2.C.1.Ne Southeastern North American Grassland & Shrubland		All vascular species			
2.C.1.Ne Southeastern North American Grassland & Shrubland		All vascular species			
2.C.1.Ne Southeastern North American Grassland & Shrubland		All vascular species			
2.C.1.Ne Southeastern North American Grassland & Shrubland		All vascular species			

Division	Reported range of richness	Sampled Growth Form	Other Comments	Native Richness/Unit Area	Exotic Richness/ Unit Area
2.C.1.Ne Southeastern North American Grassland & Shrubland		All vascular species			
2.C.1.Ne Southeastern North American Grassland & Shrubland		All vascular species			
2.C.1.Ne Southeastern North American Grassland & Shrubland		All vascular species			
2.C.1.Ne Southeastern North American Grassland & Shrubland		All vascular species			
2.C.1.Ne Southeastern North American Grassland & Shrubland		All vascular species			
2.C.1.Ne Southeastern North American Grassland & Shrubland		All vascular species			
2.C.1.Ne Southeastern North American Grassland & Shrubland		All vascular species			
2.C.1.Ne Southeastern North American Grassland & Shrubland		All vascular species			

Division	Reported range of richness	Sampled Growth Form	Other Comments	Native Richness/Unit Area	Exotic Richness/ Unit Area
2.C.1.Ne Southeastern North American Grassland & Shrubland		All vascular species			
2.C.1.Ne Southeastern North American Grassland & Shrubland		All vascular species			
2.C.1.Ne Southeastern North American Grassland & Shrubland		All vascular species			
2.C.1.Ne Southeastern North American Grassland & Shrubland		All vascular species			
2.C.1.Ne Southeastern North American Grassland & Shrubland		All vascular species			
2.C.1.Ne Southeastern North American Grassland & Shrubland		All vascular species			
2.C.1.Ne Southeastern North American Grassland & Shrubland		All vascular species			
2.C.1.Ne Southeastern North American Grassland & Shrubland		All vascular species			

Division	Reported range of richness	Sampled Growth Form	Other Comments	Native Richness/Unit Area	Exotic Richness/ Unit Area
2.C.1.Ne Southeastern North American Grassland & Shrubland		All vascular species			
2.C.1.Ne Southeastern North American Grassland & Shrubland		All vascular species			
2.C.1.Ne Southeastern North American Grassland & Shrubland		All vascular species			
2.C.1.Ne Southeastern North American Grassland & Shrubland		All vascular species			
2.C.1.Pa European Grassland & Heath		All vascular species	Overall, at both scales, mowing every one to two years maintained highest species richness.		
2.C.1.Pa European Grassland & Heath		All vascular species			
2.C.1.Pa European Grassland & Heath		All vascular species			

Species Richness_Temperate

Division	Reported range of richness	Sampled Growth Form	Other Comments	Native Richness/Unit Area	Exotic Richness/ Unit Area
2.C.1.Pa European Grassland & Heath		All vascular species			
2.C.1.Pa European Grassland & Heath		All vascular species			
2.C.1.Pa European Grassland & Heath		All vascular species			
2.C.1.Pa European Grassland & Heath		All vascular species			
2.C.1.Pa European Grassland & Heath		All vascular species			
2.C.1.Pa European Grassland & Heath		All vascular species			
2.C.1.Pa European Grassland & Heath		All vascular species			
2.C.1.Pa European Grassland & Heath		All vascular species			
2.C.1.Pa European Grassland & Heath		All vascular species			
2.C.1.Pa European Grassland & Heath		All vascular species			

Species Richness_Temperate

Division	Reported range of richness	Sampled Growth Form	Other Comments	Native Richness/Unit Area	Exotic Richness/ Unit Area
2.C.1.Pa European Grassland & Heath		All vascular species			
2.C.1.Pa European Grassland & Heath		All vascular species			
2.C.1.Pa European Grassland & Heath		All vascular species			
2.C.1.Pa European Grassland & Heath		All vascular species			
2.C.1.Pa European Grassland & Heath	Range is 7 - 33	All vascular species			
2.C.1.Pa European Grassland & Heath	Range is 12 - 50	All vascular species			
2.C.1.Pc Eastern Eurasian Grassland & Shrubland	17 to 23	All vascular species			
2.C.1.Pc Eastern Eurasian Grassland & Shrubland	14 to 18	All vascular species			

Division	Reported range of richness	Sampled Growth Form	Other Comments	Native Richness/Unit Area	Exotic Richness/ Unit Area
2.C.2.Pa. Eurasian Boreal Grassland, Meadow & Shrubland		All vascular species			
2.C.2.Pa. Eurasian Boreal Grassland, Meadow & Shrubland	Range = 21 to 127.	All vascular species			
2.C.2.Pa. Eurasian Boreal Grassland, Meadow & Shrubland		All vascular species			
2.C.2.Pa. Eurasian Boreal Grassland, Meadow & Shrubland		All vascular species			
3.B.1.Na Western North American Cool Semi-Desert Scrub & Grassland		All vascular species	SE values provided separately for natives and exotics. The larger values, that of natives, is used here.	26.8	1.6

Division	Reported range of richness	Sampled Growth Form	Other Comments	Native Richness/Unit Area	Exotic Richness/ Unit Area
3.B.1.Na Western North American Cool Semi-Desert Scrub & Grassland		All vascular species		20.6	1.7
3.B.1.Na Western North American Cool Semi-Desert Scrub & Grassland		All vascular species			
3.B.1.Pb Western Eurasian Cool Semi-Desert Scrub & Grassland	8 to 11	All vascular species			
3.B.1.Pb Western Eurasian Cool Semi-Desert Scrub & Grassland	6 to 10	All vascular species			
3.B.1.Ea Patagonian Grassland & Shrubland					
3.B.1.Ea Patagonian Grassland & Shrubland		All vascular species			
3.B.1.Ea Patagonian Grassland & Shrubland	27–29.5	All vascular species			

Division	Reported range of richness	Sampled Growth Form	Other Comments	Native Richness/Unit Area	Exotic Richness/ Unit Area
3.B.1.Ea Patagonian Grassland & Shrubland					
4.B.1.Pa European Alpine Scrub, Forb Meadow & Grassland	Range is 7 to 33.	All vascular species			
4.B.1.Pa European Alpine Scrub, Forb Meadow & Grassland	Range is 8 to 53	All vascular species			
4.B.1.Pa European Alpine Scrub, Forb Meadow & Grassland		All vascular species			
4.B.1.Pa European Alpine Scrub, Forb Meadow & Grassland		All vascular species			
4.B.1.Pa European Alpine Scrub, Forb Meadow & Grassland		All vascular species			
4.B.1.Pa European Alpine Scrub, Forb Meadow & Grassland		All vascular species			
4.B.1.Pb Central Asian Alpine Scrub, Forb Meadow & Grassland	8 to 10	All vascular species			

Species Richness_Temperate

Division	Reported range of richness	Sampled Growth Form	Other Comments	Native Richness/Unit Area	Exotic Richness/ Unit Area
4.B.1.Pb Central Asian Alpine Scrub, Forb Meadow & Grassland					
4.B.1.Pb Central Asian Alpine Scrub, Forb Meadow & Grassland					
4.B.1.Pb Central Asian Alpine Scrub, Forb Meadow & Grassland					